

Although a favorite for many decades, today the wool-matching test is little used. But the Dichotomous test developed by Comdr. Farnsworth, using circles of colored paper mounted in small black bottle tops, is an industrial test of the same sort in up-to-date and soil-resisting clothing.

Today the "hidden digit" test is perhaps the one most frequently used. This consists of a book of charts or plates, each plate containing numbers made up of spots of color set in a background of spots of the color with which the first color is often confused. Thus the number which is easily seen by the normal subject is hidden for the color deficient who falsely sees number and background as the same color.

The hidden digit test was originally designed by J. Stilling in Germany about 1878. Several decades ago Dr. Shinobu Ishihara, professor at the Imperial University in Tokyo, devised a similar test. In many of the Ishihara plates one number is seen by people of normal vision, another by color-deficients.

In order that the hidden-digit tests would be available in the United States during World War II, a U. S. edition was published. This included 46 plates, some from Stilling, some from Ishihara. Printed by the Beck Engraving Co., Inc., for the American Optical Company as distributors, this is the United States' first widely used printed tests—the A.O. test of World War II.

### War Brought New Test

During the war extensive tests showed that a suitable selection of a few of these plates would do the work of double or triple that number. So on the advice of the color blindness subcommittee of the Inter-Society Color Council, composed of the country's leading experts in this field, a revised 19-plate edition of the American Optical Company's "Pseudo-Isochromatic Plates for Testing Color Perception" was issued and is still in wide use.

But now superior tests are being devised. Drs. LeGrand H. Hardy, Gertrude Rand and M. Catherine Rittler of the Ophthalmological Institute of the College of Physicians and Surgeons of Columbia University have recently sent copies of their hidden-design test to color experts throughout the country for validation. This test is designed to give more information than any previous test of this type.

Anyone who correctly names the figures on the first half dozen plates is pretty sure to have good color vision. Using the colors most likely to be confused with gray in graded steps of chroma from faint to strong, the test indicates several degrees of color deficiency as well as showing the type of color deficiency present.

In this test the hundreds of dots on each chart are arranged in exactly the same pattern. Thus no external clue is given which the color deficient, who fails to spot the figures made by the colored dots against the background of gray dots, can memorize.

Instead of using numbers, the Hardy-Rand-Rittler test uses colored triangles, circles and squares so that a young child who has not yet learned his numbers, or an illiterate person, can take the test.

The lantern test, one of the earliest types designed but under constant improvement, is favored by railroad engineers, airplane navigators and submarine lookouts as more in line with their daily tasks. The New London U. S. Naval Lantern test is designed to weed out the 6% of men with color vision unserviceable for civil aeronautics and naval service.

Tiny spots of red, green and white are flashed on and off, two at a time, in this lantern test. Trick feature is that some of the whites, greens and reds are more intense than others. Thus intensity of the light, often used by color defectives to elude the purpose of a test and thus pass it, is made the means of detecting defective color vision.

### Traffic Lights Off-Color

Standard stop-and-go traffic lights are made blue-green and orange-red to help the color defectives distinguish them. In addition, the green, red and amber lights all differ in intensity. Intensity and their position give added hints as to their color. Colorblind people, on the other hand, have difficulty distinguishing between red and green lanterns used to control traffic when road repair is in progress, and sometimes confuse port and starboard lights on ships and airplanes.

Basic research that will make future tests easier to design and more reliable in performance has recently been completed by Dr. Deane B. Judd of the National Bureau of Standards. Concerned more with what the colorblind person sees than with the mistakes he makes, Dr. Judd has worked out in detail for the whole gamut of the Munsell Book of Color just how 400 of these colors look to colorblind individuals. About three dozen people with unmatched eyes, some of them having one normal eye and the other colorblind, furnished the basic data on which he worked.

Even better tests are promised for the future. Our knowledge of color vision has greatly expanded within the past few decades. Much fundamental study has now been completed. And the country's top color experts have shown themselves ready and willing to cooperate by checking, experimenting and advising on new tests.

*A kit containing a "hidden digit" test; a trick new gadget (in unassembled form) designed to show which colors are confused by extreme color defectives; and four colored dots selected to show that everyone is slightly blue-yellow blind has been assembled for you by Science Service. It is available for the nominal price of 75 cents. Just write Science Service, 1719 N St., N. W., Washington 6, D. C., and ask for the Color Vision kit.*

Science News Letter, September 1, 1951

### INVENTION

## Playing Card Holder Gets U. S. Patent

► THE CLUMSY cardplayer who has difficulty in holding his cards with fingers and thumb in the usual fan-like position is relieved of the task with a playing card holder on which the government has recently issued a patent.

It is an arched-shaped affair, with a T handle projecting downward. Cards are stuck in slots on the outer and upper edge of the arch. When they are in place, the whole resembles a fan. Cards are easily visible to the player, and are removed, one by one, so easily that they are less stained, worn or damaged than when handled in the conventional way.

Patent 2,564,315 was awarded to Henry L. Stark and Khattar Ead, Brooklyn, N. Y., for this invention. The holder can be cheaply made of paper, wood, plastics or metal.

Science News Letter, September 1, 1951

# YOU DON'T HAVE TO BE RICH TO RETIRE

Here's How to Enjoy Life!

Amazing, New Book Tells

You Where It Costs Less to Live

Many people spend a lifetime trying to find a place where they can retire and begin to enjoy life. Others think that only the very rich can retire from the ulcers, pressure and the hectic pace of modern business. In this country alone there are hundreds of communities where it costs less to live, where you can earn extra income through your hobby, seasonal work or part time work. You don't have to be rich to retire young—you just have to know where.

"Where To Retire On a Small Income"

Names the Places and Shows You:

1. where you can go fishing, hunting, boating and swimming practically from your front door.
2. where living costs, food costs, rents and real estate are low.
3. where you can buy a farm for only \$2,500.
4. where your hobby can bring you a good income.
5. where you can live the life you've always wanted.

Pathfinder Magazine Says, "Should

be one of the season's most popular books".

This sensational book covers cities, towns and farms from New England to California, from the Pacific Northwest to Florida, where you don't have to be rich to retire. It includes Hawaii, Puerto Rico and the Virgin Islands. Now you can find many communities where you can begin to enjoy life. Why wait till you're too old to enjoy retirement when you can retire now? If you say, "I can't afford to retire", this book will prove to your own satisfaction that you can. Act now! You risk nothing. We're so sure the American public has wanted a book like this that we give you a Money-Back Guarantee if not completely satisfied. Simply tear out this ad, print name and address and mail with \$1.00 to Harlan Publications, 4 Third Avenue, Greenlawn, New York.