

the Serbo-Croatian rules. Czech transcription has the advantage of being complete.

The following examples may serve to make this clear. Russian *a* has only one sound, as in "master." It has the same sound in Czech, but the English *a* has several sounds. If *ж* is rendered by *j* it is liable to mispronunciation; if transcribed to the Czech *ž* this liability does not arise. Russian *y* is always pronounced like the Czech *u* (like *oo* in the English word "hook"). Russian *x* can be correctly rendered by the Czech *ch*.

"Hard mute" and "soft mute" (ѣ and ъ) can only be transcribed into Czech, using the hook "after the consonant." Russian *ы* has no other European sound except the Czech *y*. The different pronunciation of the Russian *e*, ѣ, э cannot be easily expressed in English, but this becomes easy by using the Czech *ě* for the first two, especially the second.

It may be pointed out that the Czech transcription is already employed in the International Catalogue of Scientific Literature, and for some years German journals (*e.g.* *Zeitschr. f. anorg. Chem.*) have employed letters with diacritical marks in their transcription of Russian names (*e.g.* "Žemczuznyj," which in Czech is "Žemčuzný").

The objection, urged by Lord Gleichen, to the use of diacritical marks exists, but is relatively small. Most scientific journals already have such type, which is indeed necessary if Czech names are to be printed correctly. Newspapers naturally lag behind such a journal as NATURE in matters of this kind, but in time these too will doubtless find it necessary to have letters with diacritical marks in their founts.

Lord Gleichen also asks how many English people can correctly pronounce Czech letters like *č*. It is regrettable, but nevertheless true, that the correct pronunciation of foreign words is not a great characteristic of the British people, but it is as easy to learn how to pronounce Czech words as it is those of other languages. The example which was chosen by Lord Gleichen is poor, because the sound "č" exactly corresponds to the English sound "ch" (*e.g.* "church").

J. G. F. DRUCE.

Bled, Carniola, Jougo-Slavia.

A. GLAZUNOV

(formerly docent at
Petrograd Polytechnic).

Prague, Král. Vinohrady, Wenzigova 21,
Czecho-Slovakia,
August 5.

Colour Vision and Syntony.

IN NATURE of September 9, p. 357, Prof. E. H. Barton has shown how a syntonic hypothesis of colour vision may be made to represent the trichromatic theory of colour vision. There are numerous facts which are quite inconsistent with any form of the trichromatic theory. These are given in detail in my recent book on the "Physiology of Vision" and subsequent papers, and no attempt has been made to answer any one of them. Every fact points to the visual purple being the visual substance which, sensitising the liquid surrounding the cones, sets up a visual impulse in the cones when decomposed by light. Houstoun's explanation of the physical processes is in complete accordance with the facts, and so far as I am aware no valid objection to it has been found.

Any theory of vision must explain the movement of the positive after-image in the retina. For example,

if the positive after-image of a small white triangle on black velvet be obtained with one eye, on moving the head with a jerk, both eyes being covered, an irregular white figure will be seen some little distance away from the clearly cut black triangle, the negative after-image in the original position which is seen when a small amount of light is allowed to enter the eye through the lids. Another very simple method of seeing this movement of the positive after-image is to look at three windows on awaking, which are separated by walls; on closing and covering the eyes, well defined positive after-images of the windows separated by black spaces corresponding to the walls are seen. On covering the eyes and moving the head from side to side the after-images all blend into one, the black spaces being obliterated.

Let us compare the model given by Prof. Barton with the known facts of vision. For any particular light the three vibrators acting together should give the luminosity curve for that light. Barton has placed the red vibrator at about $\lambda 760 \mu\mu$; here the red has very little luminosity, whereas a driver of the length of the vibrator at this point will produce most effect. Again, drivers corresponding to the infra-red or ultra-violet will affect the red or violet vibrators respectively, whereas these regions are invisible.

When we come to colour blindness the trichromatic theory fails completely. How on this theory can the fact that more than fifty per cent. of dangerously colour blind people can pass the wool test be explained? The fact that a dichromic may have a luminosity curve similar to the normal, that the trichromic have only three colour sensations and designate the yellow region as red-green, and the other degrees of colour and light perception, has to be explained.

F. W. EDRIIDGE-GREEN.

London, September 19.

The Green Ray at Sunset and Sunrise.

THE review by Sir Arthur Schuster of Mulder's book on the green ray or green flash at rising and setting of the sun, in NATURE of September 16, p. 370, leads me to make the following remarks:

There are, in reality, two distinct phenomena which go under the name of the green flash. The first, probably the one most usually seen and the only one to which the epithet properly applies, is certainly an after-image in an eye fatigued by the red light of the sun. I have seen it many times, only at sunset, and in many localities—on the Red Sea (twice in one evening owing to the sun being occluded by a narrow bank of cloud prior to its actual setting), in Devonshire, and even in London as the sun set behind University College Hospital.

This phenomenon can be reproduced quite easily in the laboratory by means of an artificial red sun, as I demonstrated a few years ago at a meeting of the Physical Society of London.

The second phenomenon, which I have never been successful in seeing and of which I can say little, is evidently due to atmospheric dispersion; and, from the published accounts, I should judge that it should be called the blue sun or multicoloured sun or spectrum flash. It would seem to be much more rare, as I gather from Sir Arthur Schuster's previously made descriptions that it requires rather special conditions.

If this subject should get into elementary textbooks, as recommended, at least let the account of it be complete.

ALFRED W. PORTER.

University College,
London.