

To make the exposure, the plate was drawn up until the projecting pin, D, could be caught on the lever, K, which would then retain it. On depressing the outer end of this lever, however, with the finger, the hold on the pin was disengaged, and the plate flashed across the axis of the tube, allowing light to traverse the narrow slit as it flew past. The plate was then arrested on the end of the second lever, G. When an exposure of some seconds was required, as during the totality, a plate having a round orifice exposing the entire field of the eye-piece was substituted for the one with the narrow slit, and was so arranged that, when caught by the upper lever, it covered the lens, but when fallen to the second lever, exposed it entirely; when, however, this lever was in turn touched, the plate descended again far enough once more to close the lens. By touching these two levers in succession, it was then possible to make a "time exposure" with great nicety and accuracy, as proved by actual experience during the eclipse.

To secure a chronographic record of each exposure, a binding screw was provided to make one connection with the general mass of the face-plate including lever K, and another at L, to carry on the circuit when the downward motion of the lever brought the spring at its side in contact with the point projecting from L. In raising the lever for a new exposure, the spring at its side was pressed back so as to pass the point without contact.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.]

Kant's View of Space

THE following paragraphs, I believe, faithfully render sundry passages of Kant's writings:—

"Objects are given to us by means of sense (Sinnlichkeit), which is the sole source of intuitions (Anschauungen); but they are thought by the understanding, from which arise conceptions (Begriffe)." ("Kritik," p. 55. Hartenstein's Edition.)

"The understanding is the faculty of thought. Thought is knowledge by means of conception." (*Ibid.* p. 93.)

"The original consciousness of space is an intuition *à priori*, and not a conception (Begriff)." (*Ibid.* p. 60.)

"Space is nothing else than the form of all the phenomena of the external senses; that is, it is the subjective condition of sense, under which alone external intuition is possible for us." (*Ibid.* p. 61.)

"Our nature is such, that intuition can never be otherwise than sensual (Sinnlich); that is, it only contains the modes in which we are affected by objects. On the other hand, the power of thinking the object of sensual intuition, is the understanding. Neither of these faculties is superior to the other. Without sense, no object would be given us, and without understanding none would be thought. Thoughts without contents are empty, intuitions without conceptions (Begriffe) are blind." (*Ibid.* p. 82.)

"Time and space are 'mere forms of sense'" (Formen unserer Sinnlichkeit, "Prolegomena," p. 33) and "mere forms of intuition." ("Kritik," p. 76.)

With these passages before one, there can be no doubt that that thorough and acute student of Kant, Dr. Ingleby, was perfectly right when he said that Kant would have repudiated the affirmation that "space is a form of thought." For in these sentences, and in many others which might be cited, Kant expressly lays down the doctrine that thought is the work of the understanding, intuition of the sense; and that space, like time, is an intuition. The only "forms of thought" in Kant's sense, are the categories.

T. H. HUXLEY

January 14

I DO not believe Professor Sylvester has been betrayed, as Mr. G. H. Lewes asserts, into any misconception of this matter by me.

When Kant, at the outset, says, "Alles Denken aber muss sich, es sei geradezu oder im Umschwefle, vermittelst gewisser Merkmale, zuletzt auf Anschauungen...beziehen," it would take the veriest dunderhead not to see that all forms of intuition must be, indirectly at least, forms of thought. I never dreamed of disputing

so obvious a position. But I object to the phrase "forms of thought," as designating Space and Time, on the ground of precision. They are *peculiarly* forms of general Sense, and not forms of Thought *as Thought*. Kant, I believe, eschewed the phrase in that sense, and, for all I see, might for the same reason have disclaimed it.

Ilford, Jan. 14

C. M. INGLEBY

It is not *my* habit "when objections are made to what I have written, silently to correct my error or silently disregard the criticism." If the objections are well founded, I think it due to the cause of truth to make a frank confession of error, and in the opposite case to reply to the objections.

With reference, then, to Mr. Lewes's strictures in NATURE's last number, I beg to say that Dr. Ingleby has "betrayed" me into no error. If I have fallen into error, it is with my eyes open, and after satisfying myself by study of Kant, that to speak of Space and Time, whether as forms of understanding, or as forms of thought, is an unauthorised and misleading mode of expression. Space and Time are forms of sensitivity or intuition. The categories of Kant (so essentially in this point differing from those of Aristotle) do not contain Space and Time among them, and are properly called forms of understanding or thought.

To the existence of thought the operation of the understanding is a necessary preliminary.

Sensitivity and intuition are antecedent to any such operation.

Can Mr. Lewes point to any passage in Kant where Space and Time are designated *forms of thought*? I shall indeed be surprised if he can do so—as much surprised as if Mr. Todhunter or Mr. Routh, in their Mechanical Treatises, were to treat *energy* and *force* as convertible terms. To such a misuse of the word *energy* it would be little to the point to urge that *force without energy is a mere potential tendency*. It is just as little to the point in the matter at issue, for Mr. Lewes to inform the readers of NATURE that *intuition without thought is mere sensuous impression*.

Dr. Ingleby has rendered, in my opinion, a very great service to the English reading public, by drawing attention to so serious and prevalent an error as that of confounding the categories (the proper forms of thought *as thought*) with Space and Time, the forms of intuition, the Sentinels, so to say, who keep watch and ward outside the gates of the Understanding.

Athenæum Club, Jan. 15

J. J. SYLVESTER

Correlation of Colour and Music

SOME twenty-six or twenty-seven years ago, in a lecture on Light at the London Institution, I suggested an analogy between the octaves of Sound and Light; not then knowing the view of Sir J. Herschel to which Dr. Pereira subsequently called my attention.

I endeavoured to support the hypothesis of three primary colours by supposing the intermediate colours to arise from the blending of the primary. Thus orange would result from the blending of red and yellow, green from yellow and blue, and violet from the secondary red impinging on the blue or indigo. This seemed to me a less arbitrary explanation than that of Sir D. Brewster of a superposition (in degrees of intensity chosen to suit the hypothesis) of all the primary colours throughout the whole spectrum. Spectrum analysis has now much changed our views on this subject.

The interesting article in your number for January 13, by Mr. Barrett, has recalled my attention to the matter, and induces me to ask whether he, or any of your contributors, can explain a phenomenon which I have very often observed, as have doubtless others, but which I have never seen noticed in any work on Light.

It is this. When a very brilliant solar-rainbow is seen, there is plainly visible within, and forming a continuous spectrum with the main rainbow, a repetition, but in much narrower bands, of the rainbow: the same seven colours in the same order; and within this again, I have, on certain occasions, detected a third. Are these repetitions of the spectrum as suggested by Sir J. Herschel? If so, we should have two, three, and more reds, and so of the other colours, in which light, producing the impression of the same colour on the retina, would have different wavelengths, say, in the ratios of one, two, four, &c.; or is the phenomenon due to some other cause?

W. R. GROVE

January 15

I VENTURE to call attention to a curious point in connection with the very interesting note by Mr. W. F. Barrett on the "Correlation of Colour and Music," which appeared in yester-