

not in a condition to make use of it. Good architecture, for instance, is a very good thing, and one we are much in want of; but it will hardly be maintained that architects should be taught their profession at the public expense. The history of old china, of old clothes, or of postage stamps, are each of great interest to more or less extensive sections of the community, and much may be said in each case to prove the value of the study; but surely no honest representative of the nation could vote, say, the moderate sum of a million sterling for three museums to exhibit these objects, with a full staff of beadles, curators, and professors at an equally moderate expenditure of £10,000 annually, and a like sum for the purchase of specimens. But if we once admit the right of the Government to support institutions for the benefit of any class of students or amateurs however large and respectable, we adopt a principle which will enable us to offer but a feeble resistance to the claims of less and less extensive interests whenever they happen to become the fashion.

If it be asked (as it will be) what we are to do with existing institutions supported by Government, I am at once ready with an answer. Taking the typical examples of the National Gallery and the British Museum, I maintain that these institutions should be reorganised, so as to make them in the highest degree entertaining and instructive to the mass of the people;—that no public money should be spent on the purchase of specimens, but what they already contain should be so thoroughly cared for and utilised as to make these establishments the safest, the best, and the most worthy receptacles for the treasures accumulated by wealthy amateurs and students, who would then be ready to bestow them on the nation to a much greater extent than they do at present. From the duplicates which would thus accumulate in these institutions, the other great centres of population in the kingdom should be proportionately supplied, and from the Metropolitan centres trained officers should be sent to organise and superintend local institutions, such a proportion of their salaries being paid by Government as fairly to equalise the expenditure of public money over the whole kingdom, and thus not infringe that great principle of equality and justice which I maintain should be our guide in all such cases.

This communication will doubtless call forth much opposition, but I trust it will also elicit the support of some of those eminent scientific men, who I know hold similar general views, and who are so much better able than I am to explain and support them.

ALFRED R. WALLACE

Kant's View of Space

IN the very remarkable contribution by Professor Sylvester, (NATURE, No. 9) this sentence occurs: "It is very common, not to say universal, with English writers, even such authorised ones as Whewell, Lewes, or Herbert Spencer, to refer to Kant's doctrine as affirming space to be a 'form of thought' 'or of the understanding.' This is putting into Kant's mouth (as pointed out to me by Dr. C. M. Ingleby) words which he would have been the first to disclaim."

It is not on personal grounds that I wish to rectify the misconception into which Dr. Ingleby has betrayed Professor Sylvester. When objections are made to what I have written, it is my habit either silently to correct my error, or silently to disregard the criticism. In the present case I might be perfectly contented to disregard a criticism which any one who even glanced at my exposition of Kant would see to be altogether inexact; but as misapprehensions of Kant are painfully abundant, readers of Kant being few, and those who take his name in vain being many, it may be worth while to stop *this* error from getting into circulation through the channel of NATURE. Kant assuredly did teach, as Professor Sylvester says, and as I have repeatedly stated, that space is a form of intuition. But there is no discrepancy at all in also saying that he taught space to be a "form of thought," since every student of Kant knows that intuition without thought is mere sensuous *impression*. Kant considered the mind under three aspects, Sensibility, Understanding, and Reason. The *à priori* forms of Sensibility, which rendered Experience possible, were Space and Time: these were forms of thought, conditions of cognition. It was by such forms of thought that he reoccupied the position taken by Leibnitz in defending and amending the doctrine of innate ideas, namely, that knowledge has another source besides sensible experience,—the *intellectus ipse*.

While, therefore, any one who spoke of space as a "form of the understanding" would certainly use language which Kant would have disclaimed, Kant himself would have been surprised to hear that space was not held by him as a "form of thought."

January 3

GEORGE HENRY LEWES

Transcendent Space

AS my name has been mentioned by Prof. Sylvester, at p. 238 of NATURE, in connection with this subject, I must ask you to allow me to make a brief remark thereupon. With the late Prof. Donkin I have not the least doubt as to this notion being "only a disguised form of algebraical formulisation." I observe that Prof. Sylvester, while *hypothetically* mentioning his own blindness, backs up his belief by the names of seven great mathematicians, who are *hypothetically* assumed to have "an inner assurance of the reality" of space of four dimensions. A roll-call of great names is no evidence of a strong position, and in the present case the citation is somewhat unfortunate. My old friend Dr. Salmon, who is one of the seven mathematicians cited, would, I am sure, disclaim any such "inner assurance." Without any breach of confidence I may quote his own reply to a question which I put to him long before the delivery of Prof. Sylvester's address. It was in these words: "I do not profess to be able to conceive *affairs* of four dimensions. . . . I advise you to believe whatever Sylvester tells you, for he has the power of seeing things invisible to ordinary mortals."

It would be more satisfactory to unbelievers like myself if the gifted author of the address were to assure the world that he had an insight into, or clear conception of, this transcendent space, According to my own view, *space cannot have more or less than three dimensions*; but if a form of extension having four dimensions were once revealed to us, tridimensional space (in which we now "live and move and have our being," and which is for us one of *two only universal forms of sense*), together with all that it contains, would become zero, and thenceforward we should only be able to conceive tridimensional space as a limit to the finite contents of quadridimensional space. Nay, more, the new space would be inevitably fatal to the law of gravitation, which is a transcendental deduction from the three only dimensions of space. Of course I see plainly enough that the Hamiltonian theory of "quaternions" (which is at present concretely interpretable only in time, *i.e.* as applied to sets of five points in time) might be developed into a rectorial system of *Quinions*, where the four symbols of operation would express the rotation of a straight line about four symmetrical axes; but the form of extension required for the interpretation of such a system is not only inconceivable, but is seemingly opposed to the very intellect itself.

Ilford, January 8

C. M. INGLEBY

The Cyclone

IN answer to the request of your correspondent, F.R.A.S., of Plymouth, in No. 8 of NATURE, I venture to send the following observations of the storm of Dec. 16, in West Suffolk. The barometer is reduced to sea level and 32° Fahr.

Dec. 16—2 p.m.: bar. 29'598, having fallen about '15 since the morning: air temp. 44° max. of day hours; wind fresh, S., sky overcast.

5 p.m.: bar. 29'334, air temp. 42°; wind S.S.E. high, with heavy rain, which had begun about 4.

10 p.m.: bar. 28'821, a fall of '5 in 5 hours; wind S.W. gale; rain stopped. The rainfall amounted to '53 in. During this gale the temp. rose to 54°. The wind veered, at times blowing with great violence, attaining its maximum a little before 11 p.m. Direction nearly W. After 11 the force began to abate.

12 mid.: bar. 29'031, a rise of '2; wind high from W.N.W.

Dec. 17.—Bar. 29'625, wind still very fresh from W.N.W.

The movement of the barometer from 2 to 10 p.m. of 16th, was 0'78 in., and on morning of 17th the pressure returned to the same point as on 2 p.m. of 16th. The maximum of the wind force occurred a little after the minimum of air pressure, when barometer was rising (compare Capt. Toynbee's "Isobaric Curves" pp. 6, 7). The veering of the wind shows that the track of the centre of the storm passed to the N. of this latitude (52° N.).

Haverhill, Suffolk, Dec. 28

I ONLY noticed this morning a request of one of your correspondents, who wishes some one in the north or east of England to give an account of the storm which occurred on the 17th instant, as he considers it a remarkable instance of a cyclone.

I enclose the hourly readings of the barograph and anemograph at Stonyhurst during the storm that occurred on the 17th and 19th, but I doubt whether they will be found very confirmatory of the supposed nature of the storm. The fall and rise of the barometer agree remarkably with the complete circuit through which the wind veered from W.S.W. through S. and N. back to W.S.W., but the storm, as is usually the case, began about