slight inaccuracies of thought and language occur. Is it really the case, for example, that rate of interest (p. 181) is totally independent of *time?*

LETTERS TO THE EDITOR

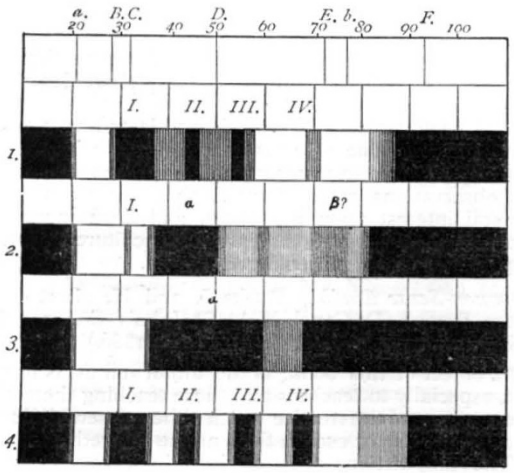
[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.*]

Chlorophyll

IN a short note in NATURE (vol. xxxii. p. 342) I mentioned the discovery of a colourless substance produced by the action of reducing agents on chlorophyll and regenerating, on being exposed to the air, the original green solution. I may be allowed to add to my previous statement that if this reaction is not pushed too far and the resulting substance is duly concentrated, it is not colourless, but of a reddish-brown by daylight, of a splendid ruby red (very different from the well-known port-wine red colour of chlorophyll) by limelight. Its spectrum is chiefly characterised by the total absence of band I., and the presence of a broad band corresponding exactly to band II., and the two intervals between I. and II., and between II. and III. Band IV. seems also to be present, though somewhat altered in its position and intensity.

The presence of a slightest trace of oxygen is immediately announced by the appearance of the I. chlorophyll band, so



that the reaction may be considered as a most sensitive test for oxygen. On further exposure to the air, as already mentioned, chlorophyll is regenerated. This new substance being evidently a product of reduction of *chlorophylline*, the green-colouring matter of chlorophyll isolated and described by me in 1869, it may be called *protochlorophylline*, or simply *protophylline*.

Its solutions can be kept in sealed glass tubes containing H_2 or CO_2: *in this latter case in a dark place, for on being exposed to light they turn green.* Can it be inferred from these facts that the oxidation takes place at the expense of CO_2—that carbonic acid is actually reduced under the joint action of light and of a chlorophyll solution? The question, if answered in the affirmative, is of so great importance, that I am now taking all the pains to arrive at a definite conclusion.

The optical properties of *protophylline* seem to indicate its presence in freshly-prepared chlorophyll solutions. Indeed the difference presented by the spectrum of a freshly-prepared green solution and that of Mr. Stokes's *modified chlorophyll* may be easily accounted for by the presence in the former of the broad *protophylline* band intercepting the rays of light in the two intervals between the bands I. II. and III., as just mentioned. To the presence of different quantities of *protophylline* may be likewise attributed the varying relative intensity of the bands II. III. IV.,—a fact that has attracted the attention of many observers.

At all events, it cannot be doubted that the study of this curious substance, though attended with considerable difficulties, all the operations taking place in a total absence of oxygen, and under the continual control of the spectroscope, will throw a new light on that most important of physiological problems—the part played by chlorophyll in the decomposition of carbonic acid by the living plant. C. TIMIRIAZEFF

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The Stone Age in the Malay Peninsula

IN NATURE, vol. xxxiii. p. 377, there is a notice of a paper by M. de Morgan, published in *Cosmos*, on the Stone Age in the Malay Peninsula. Will you permit me to offer a few remarks with reference to this matter. In the first place, it is said that M. de Morgan came into contact with three native races, which he respectively names Sakayes [Sakai], Seumangs [Sĕmang], and Rayats [Ryot]. I have put in brackets the commonly-accepted spelling in the Straits. It is funny what peculiar mistakes travellers make when passing through a country the language of which they do not understand, ryot being the word used in the Straits to express those followers or retainers of a native chief who are not actually his debt slaves, but who owe him more or less of feudal allegiance; Malays here invariably use the word when speaking of the following of a Sakai chief. The word ryot is, I believe, also used in the same sense in India. With reference to the tribes of whom M. de Morgan speaks as living in the recesses of the mountains, and whom the Sakaies called "fire apes," I cannot help remarking that I have never heard the Sakaies speak of them myself, nor can I find that any other Government servant here has heard of them either; still we are in pretty constant communication with certain of the Sakaies of these hills, and for my part I have at different times stayed for longer and shorter periods at the clearings of some of the chiefs whom M. de Morgan visited, and moreover I have employed most of the same Malays who followed M. de Morgan. By the bye, these were Sumatran Malays, and they told me some very extraordinary tales about the wild tribes before I started up country with them; these foreign Malays are especially addicted to telling marvellous tales of the wild tribes of the mountains, but so far I have not been able to verify their information in the least degree either from the Sakaies themselves or from native Malay sources. It would be interesting to know what equivalent was used for the expression "fire apes." Was it a Malay word or a Sakai word? With reference to the Stone Age I quite agree with M. de Morgan in believing that at a not very late period—probably just before the Malay invasion—there were tribes living in the interior who were not acquainted with the use of iron; up to the present moment I have been able to collect twenty-two stone implements. I have sent drawings and notices of these to the Anthropological Institute. I may, however, here mention that of these twenty-two specimens one is the half of a stone bracelet; the rest are all chopping-tools of different descriptions, used, I think we may fairly conclude, by a race of boat-builders, who most likely constructed dug-outs, much like the Malays of the present day. I adduce this supposition from the fact that of my twenty-one specimens two are perfect gouges, and six others are of the description which Dr. Evans has classed under adzes. The cutting-edges of nearly all my specimens have been considerably damaged by use. The high polish which M. de Morgan's specimens—and mine also—exhibit is, I think, accounted for in a great measure by the fact that they are used and very highly prized by the Malays as whetstones; the women preserve them, especially to sharpen their razors on, with which they shave the heads of their children during the periods ordered by custom or religious law; and the men were, until lately, very anxious to procure them to sharpen the iron spurs used in cock-fighting. As almost all of the specimens procured by me have been purchased of Malays who have inherited them from their ancestors, and prized them as heir-looms, it is, I think, reasonable to suppose that in their original condition some of them, at least, were considerably rougher than when they came into our hands; this supposition is further confirmed by a remark made to me the other day by a Malay chief. He said that he once had a thunderstone given to him which was so rough that he had to wear it down on his emery-wheel before he could use it as a whetstone. I have one specimen which has no cutting-edge, but is squared off at each end and is almost spindle-shaped. I have