No. 7.—*Line in the Indigo at or near G*

ALVAN CLARK, JUN. At 435; assumed to be 434 G hydrogen.
 PROCTOR. At 121; more refrangible than H γ (114); coincident with a line (of oxygen?) in lumière tube. Probably there is some error here; this line as positioned by Lord Lindsay and Alvan Clark, jun., being slightly less refrangible than G.—J. R. C.

LORD LINDSAY. Slightly less refrangible than G; a broad, ill-defined band, seen only with a wide slit.

The continuous Spectrum

T. F. (Torquay). Faint from about D to beyond F.
 FLÜGEL. Faint green reaching from aurora line to F.

(Schellen.)
 SCHMIDT. From aurora line to F; frequently resolved into three bright lines.
 (Schellen.)

ZÖLLNER. Considers the bright lines or bands Nos. 4, 6, and 7 to be a continuous spectrum broken up by dark absorption bands.
 (Schellen.)

Guildford, Nov. 9

J. RAND CAPRON

Ocean Rainfall

WITH reference to Mr. Miller's note (NATURE, vol. vii. p. 123), I think it may be desirable to point out that a good many steps have been taken in the direction he suggests. As I believe Mr. Miller is a reader of "British Rainfall," he will probably hardly need to be reminded of the article on "Ocean Rainfall," by Mr. F. Gaster in the volume for 1866, wherein tables of the prevalence of rain in the North and South Atlantic and North Pacific Oceans are given in considerable detail. The determination of the amount is a far more difficult matter for a number of reasons, which would require much space fully to explain, and I am not at all surprised at the feat being considered "impossible;" but the use of that word is becoming restricted. At the British Association meeting at Brighton, Mr. W. T. Black was kind enough to show me a rain gauge which he had had constructed somewhat on the plan described by him in the *Journal of the Scottish Meteorological Society* for January 1870, and which he intended should make a few voyages on purpose to test.

With respect to gauges on lightships, I may state that at my suggestion the Elder Brethren of the Trinity House allowed a gauge to be placed upon the *Nore* lightship in the autumn of 1865. It was carefully observed by the officers on board for about two years, and the returns were compared with simultaneous records kept at Sheerness on the Kentish, and Shoeburyness on the Essex coast. I cannot say that I was satisfied with the results, which were principally vitiated by spray and wind. The gauge was bolted rigidly to a post on the deck of the vessel, as I then thought this preferable to the incessant oscillations which would result from the employment of gimbals.

Considering the sources of inaccuracy attaching to the measurement of rainfall at sea, and the fact that, so far as I am aware, lightships are seldom more than ten or twenty miles from land, I think that there are few cases in which they could render valuable aid.

As to the *Challenger* I know nothing; but I do know that it was the joint resolution of Mr. Black and myself each and both to do what we could towards obtaining quantitative records of the rainfall of the North Atlantic, and when last I heard from him there were prospects of partial success. Only partial because we do not hope or expect to ascertain the true fall, but merely the relative fall in different zones, or portions of the ocean.

Camden Square, London

G. J. SYMONS

INTRODUCTORY LECTURE OF THE MURCHISON CHAIR OF GEOLOGY AT EDINBURGH, SESSION 1872-3 *

II.

MUCH has recently been said (so much, indeed, that the subject begins to get somewhat wearisome) regarding the necessity for wide-spread scientific instruction to enable our artisans to compete with the advancing industry of foreign countries. Technical education has

* Continued from p. 165.

become a kind of political cry, like the county franchise or women's electoral disabilities. We hear, continually, too, of the need for a more special training in science for such professional pursuits as those of the engineer and the military officer, or of the men who devote themselves to the task of geographical discovery. Far be it from me to say one word that would seem to imply an undervaluing of such practical applications of science. Most heartily do I wish that a technical school were established in every great town in the country, and that every man whose pursuits in life might call for the aid of science, should have the means of obtaining sound practical instruction in those branches likely to be of service to him.

But I cannot believe that such utilitarian views, important though they undoubtedly are, set before us the true place which science ought to hold, and which I am convinced it will one day hold in the general system of education in this country. Scientific culture is something more than a weapon to help us in the keen warfare of trade and commerce. It is, in truth, itself a noble form of education, filling a place which can be filled by none other, and without which no modern culture of the higher type can now rightly claim to be regarded as liberal.

It is this aspect of the subject which I seek to impress upon your minds to-day. I do so the more readily since it seems to me that your presence as members of this voluntary class is a token that you recognise with me the desirability of adding to the traditional methods of education. The matters which will come to be dealt with here lie outside of the ordinary curriculum of study. Yet they form part of that wider field which must ere long be conjoined with the older territories as the domain now to be required for higher culture.

Apart altogether from any practical application to be made of a scientific training for the active business of life, such a training seems to me to deserve and require a place in our ordinary system of education on several grounds, of which I shall at present notice only two—firstly, because it trains the observing faculty; and, secondly, because it stimulates the imaginative faculty.

I. Taking the lowest view of the case, it will not be denied that a habit of quick and accurate observation is one of the most advantageous powers with which a man or woman can be equipped. Such a habit often makes all the difference between a successful and an unsuccessful career. In point of actual hard-thinking power a man may be greatly superior to his fellows, but this power is not enough of itself alone to ensure success in the battle of life. Much must ever depend on the rapidity and shrewdness with which passing events are noted and provided for; or, in other words, the care with which the observing faculty is cultivated as well as the judgment.

But beyond and above such considerations we cannot doubt that the observing spirit carries about with it a multiplied power of enjoyment—so multiplied, indeed, that, placed beside the unobserving spirit, it seems almost to have been gifted with another sense. A well-trained power of observation never suffers its possessor to feel wholly alone. Even out of the most solitary scenes it can gather pleasant companionship, and amid the ordinary monotonous routine of life it finds recreation where, in its absence, men are apt to encounter only dullness. The story of our childhood—"Eyes and no Eyes"—has in this respect a significance for people of all ages as well as for schoolboys.

If you think of it you will probably find that what we ordinarily term *common sense* springs in no small measure out of this habit of observation. A man who is wont to keep his eyes open and take note of the changes continually going on around him, both among men and things, is more likely to acquire just views of the business of life than a man who takes notice only of what forces itself upon his attention.

From the moment of our birth we are surrounded by