

this statement, I would say that I know of no such instance. If there are cases of lines showing structure by the ordinary grating, which I do not mention, it is simply that my attention has not been directed to them, and I should venture to guarantee that if observed by either the interferometer or the echelon, they must show the same structure—or a finer.

I should have thought the tripling of the middle green line in the case of the green mercury and cadmium lines a matter of sufficient importance to add to those figured in Mr. Preston's paper.

To illustrate the preceding remarks, as well as to show the performance of the interferometer, I present a figure showing the three types of Zeeman effect, and another showing how these results are confirmed by the echelon.

It will be observed that there is an indication of structure in the outer lines, but at this time they had not actually been resolved. This has since been accomplished, as shown in the following figure :—

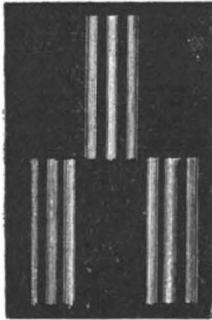


FIG. 3.

The following is a list of the radiations thus far examined, and their classifications according to these types :—

Mercury...	Yellow lines...	Type I.
	Green line ... ..	„ III.
	Violet line ... ..	„ II.
Cadmium ...	Red line ... ..	„ I.
	Green line ... ..	„ III.
	Blue line ... ..	„ II.
Zinc ... ..	Red line ... ..	„ I.
(? Cadmium)...	Green line ... ..	„ III.
	Blue line ... ..	„ II.
Sodium ... ..	Yellow lines...	„ II.
Thallium ...	Green line ... ..	„ II. (doubtful)
Lithium ...	Red line ... ..	Broadened.
<sup>1</sup> Hydrogen ...	Red line ... ..	Broadened.
Helium ... ..	Yellow line ... ..	Broadened.
	Green line ... ..	Type I.
Gold ... ..	Yellow line ... ..	„ II.
	Green line ... ..	„ I.
Silver ... ..	Yellow line ... ..	„ I.
	Green line ... ..	„ I.
<sup>2</sup> Copper ... ..	Yellow line ... ..	„ IV.
	Green lines ... ..	„ I.
Magnesium ...	Green line (5183)...	„ III.
	Green line (5172)...	„ II.
	Green line (5167)...	„ I.
<sup>2</sup> Manganese ...	Green line (5340)...	„ IV.
Argon ... ..	Red line ... ..	„ I.
Tin ... ..	Red line (6450) ...	„ II.
	Yellow line (5798) ...	„ I.
	Yellow line (5587) ...	„ I.
	Yellow line (5564) ...	„ I.
Iron ... ..	Most lines ... ..	„ I.
Carbon .....	Component lines of } Unaffected.	
	banded spectrum }	

The University of Chicago Ryerson Physical Laboratory, Feb. 9. A. A. MICHELSON.

<sup>1</sup> Since this list was first published, decided indications of structure have been noticed, especially in the broadened middle line, which under favourable conditions appears as a group of six or seven very fine lines just resolvable, brightest at the centre, and extending through the entire space between the outer groups. Similar indications, though less distinct, were traced in the outer groups.

<sup>2</sup> Type IV. was added to include cases where a broad or complex line was simplified or narrowed in the magnetic field. This, as regards the copper line and the manganese line, is true of the central line of the triplet, and not (as might be inferred from the original paper) of the whole group.

Attraction in a Spherical Hollow.

THE theorem you published in your number of January 19, under the above head, may easily be deduced from the parallelogram of forces put in this form :

Let  $\sigma a$  be intensity and direction of an attractive force,  $\sigma b$  both for a repulsing force ; then the resultant of the two forces in  $\sigma$  will be parallel and equal to  $ba$ .

LANG.

Vienna, February 18.

THE REPORT OF THE SELECT COMMITTEE ON THE SCIENCE AND ART DEPARTMENT.

IN the course of last year the newspapers contained an account of the doings of the Select Committee of the House of Commons appointed to inquire into, and report upon, the administration of the Museums of the Science and Art Department. It was an open secret that some of the members of that Committee were bitterly opposed to the officials of the Department ; but however this might be, all evidence tending to throw discredit was very widely reported long before the Report was issued.

The Report of the Committee in due time made its appearance, and it has now been considered by the Lords of the Committee on Education. The result has been embodied in the shape of the following Minute, which has just been distributed among the Members of the House of Commons and others.

By the Right Honourable the Lords of the Committee of Her Majesty's most Honourable Privy Council on Education.

Present :—His Grace the Duke of Devonshire, K.G., Lord President of the Council ; the Right Hon. Sir John E. Gorst, M.P., Vice-President of the Committee of Council on Education.

(1) The Lords of the Committee of Council on Education consider the Second Report from the Select Committee of 1898 appointed to inquire into and report upon the administration and cost of the Museums of the Science and Art Department. My Lords have also before them the observations on this Report prepared in accordance with their instructions by the Secretary of the Science and Art Department, a copy of which is appended to this Minute.

(2) A reference to the proceedings of the Committee shows that pp. 1 to 16 of the Report are based upon the Chairman's draft. This part of the Report appears to contain a correct statement of facts, but it is followed by paragraphs, introduced as amendments, which traverse to a great extent the same ground, and contain many inaccuracies and some inconsistencies.

(3) Having regard to passages which appear to reflect on individual officers, My Lords desire to emphasise the fact that they alone are responsible to Parliament for the administration of the Museums, and to declare that their directions have been loyally carried out by the staff, and that they retain the fullest confidence in Sir John Donnelly and his colleagues.

(4) They regret that the Committee should have insinuated in their Report that officers have been appointed because of their relationship to members of the staff, and have been dismissed because of the evidence they gave to the Committee. Such insinuations are devoid of any foundation in fact.

By order of the Committee of Council on Education.

SCIENCE AT LIVERPOOL.

THE Lord Mayor of Liverpool is to be congratulated upon a new departure. The Municipal authorities of one of our most important cities have actually held high festival in honour of a man of science, the occasion being the award of the Rumford Medal to Prof. Lodge. The Lord Mayor in the course of his speech said :

“Prof. Lodge was appointed to Liverpool University College in 1881, and since that time he had been closely associated with the work of the institution and done much to advance its reputation. Those who had come under the guidance and instruction of Prof. Lodge testified uniformly to his urbanity, courtesy, and kindness, and to the clearness and completeness of the instruction which he afforded them, but, apart from that, the original experimental work of Prof. Lodge entitled him to the greatest distinction. Their guest was a many-sided man, but the irrefragable certificate of his excellency as a man of science he received when he was awarded the Rumford Medal by the Royal Society. As to Prof. Lodge’s attachment to Liverpool, it was so far back as 1881 that they were fortunate enough to secure association with him, and, notwithstanding temptations—some they knew of, and others of which they did not know—he had remained faithful to Liverpool. He thought he voiced the feelings of his fellow-citizens when he expressed the hope that Prof. Lodge would long continue his work in their midst. University College was an institution of which, with every reason, they were most proud, and he believed that in addition to the instruction which was there imparted, the taste of the community was directly raised, and the relations of the community to thought were very considerably ennobled by the existence of the college in their midst. The honour done to Prof. Lodge by awarding him the Rumford Medal was emphasised by the presence that night of some of the foremost men of science—Sir William Crookes, Prof. Fitzgerald, Prof. Myers, and others. If it required any further emphasis, it would have been afforded by the letters which he had received from some of the most prominent men of the time, in which they all expressed their deep regret at not being able to be present to do honour to their distinguished guest.”

The Lord Mayor in conclusion alluded to the necessity for the erection and endowment of a physical laboratory at University College, and expressed the hope that before long one worthy of the institution would be provided, in which Prof. Lodge could carry on his important scientific work.

Prof. Lodge said he could not adequately express his sense of gratitude to the Lord Mayor for his speech—a speech of transparent sincerity—whether he deserved it or not. The chief magistrate had spoken about the endowment of a physical laboratory. The man or men who endowed such a laboratory in Liverpool would be doing a tremendous piece of work for the advancement of science. They of University College felt greatly indebted to the Lord Mayor for that magnificent reception and entertainment, and they rejoiced in the links that were every year drawing closer the city and University College. The contact could not be too close. He desired to take that opportunity of expressing his deep sense of the extreme kindness which had been shown to him during the time he had been in Liverpool. A few of his friends had gone, and amongst others, George Holt. No one helped him more directly in his scientific work than George Holt. The requirements of a man of science were not only friendly, but, unfortunately, they were also material, and it was a great thing that citizens of Liverpool and other places helped men of science to do their work. That was what George Holt and others had done, and what he believed others would do. The gathering that night was a remarkable proof of the amount of good feeling and appreciation shown by scientific men for the magnificent act of the Lord Mayor in doing honour to science, for the honour was really done to the Rumford Medal of the Royal Society. The chief magistrate of Liverpool recognised in the Royal Society the fountain of all purely scientific honour in this country, and he also recognised the biennial award of the Rumford Medal as an event of national—nay, even sometimes of international importance—because it was often given to foreigners, and in this way promoted friendly feeling among the workers in science in different parts of the world. It was undoubtedly a great honour to receive the Rumford Medal, and he was astonished when he got the intimation that by some concatenation of circumstances it had been awarded to him. After a reference to the splendid work done in connection with University College by Dr. Rendal, the former principal, Prof. Lodge concluded by saying that they in this peaceful and prosperous time had inherited the fruits of the labours of thousands who had gone before, and as the Lord Mayor had reminded

them, they owed a great deal to the splendid era of peace through which they had lived, for it had given them an insight into the processes of nature more deeply than ever it was possible before. Science was yet in its infancy, human civilisation was but emerging from its cradle, the smoke and the noise and the squalor outside were evidences that we had not proceeded far on the road to civilisation; but we had made a start—a secure start, he hoped, this time—and he thought the human race would not again fall back.

Principal Glazebrook, speaking later, said that the estimated cost of a physical laboratory for Liverpool was between 30,000*l.* and 40,000*l.* One generous donor who at present wished to remain unknown had promised 10,000*l.*, and that night Sir John Brunner had offered 5000*l.*, whilst Mr. Alfred Booth had made a challenge offer of 2500*l.* if three other gentlemen would give the same amount.

The dinner, then, has not been without important results, and we hope that such an admirable precedent will be often followed.

#### AN ANTARCTIC MEETING IN BERLIN.

EVER since the idea of despatching a German exploring expedition to the Antarctic was first mooted in 1895, the leading scientific men of that country, headed by the veteran champion of Antarctic research, Dr. Neumayr, have been untiring in their efforts to bring the idea to practical realisation, and one by one most of the preliminary difficulties have been overcome. A year ago the project began to take definite shape, and the important question of the choice of a leader was solved by the adoption as such of Dr. Erich von Drygalski, then on the point of completing his lengthened studies on the inland ice of Greenland. During the past twelvemonth meetings have been held in many of the chief cities of Germany, where the proposals put forward by Dr. Drygalski and others have met with an enthusiastic response. The only remaining obstacle to success is the largeness of the sum required for the expedition, which can hardly be raised by private subscriptions, although these have already reached a considerable amount. It has therefore been necessary to look for Government aid in the matter, and the promoters of the enterprise have met with cordial encouragement in official quarters; but, with a view to further arousing the interest of influential circles in the capital, a combined meeting of the Berlin Geographical Society and of the Berlin-Charlottenburg section of the German Colonial Society was held on January 16 last, under the presidency of Baron von Richthofen, for the purpose of putting before the public the reasons for the despatch of an expedition and the plans which have already been formed for its prosecution.

The meeting, at which many distinguished visitors were present by invitation of the two societies, was opened by a short preliminary address from Baron von Richthofen, who sketched the history of the movement, and gave some account of the previous polar work of the chosen leader. Then, after some remarks by Prince von Arenberg, who represented the Colonial Society, Dr. von Drygalski spoke on the scientific, practical and national importance of the proposed expedition. He began by contrasting the broad features of the North and South Polar regions—the former now known to be occupied by a deep sea, the scattered islands in which form but the outposts of the known continents—while, in the South, men’s minds have from very early times pictured the existence of a vast polar continent, the glamour of which long exercised a potent attraction on voyagers, and was finally dissipated only by the discoveries of Cook at the end of the last century. Sketching the progress of discovery since that navigator’s time, the speaker laid stress on the important influence exerted by the German