small flue in the wall, and will accommodate eight full-sized gas muffles. All the gas, water, heating, and fume pipes, together with the drains, which have specially arranged intercepting tanks to prevent the loss of mercury or the carrying of solid matter into the sewers, are carried beneath the benches in an ample stone-paved recess below the floor level. There is an easy means of access to all these pipes by sliding out the bottoms of the apparatus stores, which are arranged below each bench, and protected by an iron foot-rail.

Air from outside is also admitted from the same space, and is thus slightly warmed before entering the laboratory. The glass lights in the roof can, if desired, be opened. Artificial light is provided by six powerful self-ventilating Wenham gas-lamps, but it is hoped in time to provide incandescent electric lights to each bench.

Just outside the laboratory is a balance room fitted with six Oertling balances; this room is small, but the exigencies of the site did not permit of a larger area. Opposite the balance room a spiral staircase enables the examiner in charge to at once descend to the combustion laboratory. This room, 23 × 13, is fitted with seven stone-topped combustion benches, each 4ft. 6in. × 1ft. 3in., provided with a ¾in. fullway gas cock. Behind this is a vault lighted by prism light in the laboratory floor, in which is placed a powerful high-pressure water heating apparatus. Outside in the area is a washing-up room, provided with requisite shelves, sink, &c., and supplied with gas, so that the rougher operations of a laboratory, the handling of carboys, storage of acids and bulky chemicals, &c., can there take place.

From the house the laboratory is entered by a corridor starting from the cloak-room. The latter is large and amply provided with all necessaries, and with it communicates a commodious and well-fitted lavatory, having hot and cold water and all necessary fittings.

Behind the office, a handsome oak-floored room in the house itself will serve as a suitable laboratory for gas analyses.

Besides the accommodation here described, the house contains fifteen large rooms and a fine entrance hall. On the ground floor the front room serves as the office. The first floor supplies two large council and committee rooms, while the basement furnishes the housekeeper with ample accommodation. It will thus be seen that there is plenty of room for expansion.

The proverbial delays of the law prevented the House Committee from getting to work until August had begun. Its members are to be congratulated on the work they have done, and the time, four months, in which it has been accomplished.

The opening of the laboratories took place on Friday, December 8, at one o'clock, when the President received a number of gentlemen, who subsequently inspected the new buildings. The company included Sir F. Abel, F.R.S., Dr. Bell, F.R.S., Dr. H. E. Armstrong, F.R.S., Dr. Russell, F.R.S., Prof. Ramsay, F.R.S., Prof. Hartley, F.R.S., Prof. Clowes, Mr. C. E. Groves, F.R.S., Prof. Meldola, F.R.S., Mr. R. J. Friswell, Mr. O. Hehner, Dr. T. A. Lawson, Mr. D. Howard, Mr. Ernest Hart, and many other gentlemen and representatives of the press. Letters and telegrams regretting absence were received from Sir W. Foster, M.P., Sir H. Roscoe, M.P., Mr. Fowler, M.P., Mr. Norman Lockyer, F.R.S., Prof. J. M. Thomson, the Duke of Bedford, &c.

At half-past one the President delivered a short address dealing with the history and objects of the Institute, which now consists of 731 fellows and 104 associates, and has 200 registered students on its books. On the conclusion of this brief ceremony the laboratories being declared open, the President invited the assembled company to luncheon, which was laid in the council rooms. Sir F. Abel proposed the President's health, to which Dr. Tilden briefly replied, after which the meeting broke up.

SCIENCE IN THE MAGAZINES.

DR. A. R. WALLACE contributes to the *Fortnightly* the second part of his article on "The Ice Age and its Work." He deals in detail with the erosion of lake basins, first describing the different kinds of lakes, and their distribution, and then the conditions that favour the production of lakes by ice-erosion. The objections of modern writers are afterwards considered *seriatim*, and the manner in which they are handled will give pleasure to all glacialists. The alternative theory to that of ice-erosion, for the origin of the class of lakes discussed, viz. that they were formed before the glacial epoch, by earth movements of the same nature as those concerned in mountain formation, appears to be fairly presented, and the difficulties in the way of accepting it are pointed out. Evidence is adduced to show that the contours and outlines of the lakes in question indicate erosion rather than submergence, and, finally, the Lake of Geneva is taken as a test of the two rival theories. As the subject discussed is very complex, and the argument essentially a cumulative one, Dr. Wallace gives the following summary of the main points:—

In the first place, it has been shown that the valley lakes of highly glaciated districts form a distinct class, which are highly characteristic, if not altogether peculiar, since in none of the mountain ranges of the tropics, or of non-glaciated regions over the whole world, are any similar lakes to be found.

The special conditions favourable to the erosion of lake-basins, and the mode of action of the ice-tool, are then discussed, and it is shown that these conditions have been either overlooked or ignored by the opponents of the theory of ice-erosion.

The objections of modern writers are then considered, and they are shown to be founded either on mistaken ideas as to the mode of erosion by glaciers, or on not taking into account results of glacier-action which they themselves either admit or have not attempted to disprove.

The alternative theory—that earth-movements of various kinds led to the production of lake-basins in all mountain ranges, and that those in glaciated regions were preserved by being filled with ice—is shown to be beset with numerous difficulties, physical, geological, and geographical, which its supporters have not attempted to overcome. It is also pointed out that this theory in no way explains the occurrence of the largest and deepest lakes in the largest river valleys, or in those valleys where there was the greatest concentration of glaciers, a peculiarity of their distribution which points directly and unmistakably to ice-erosion.

A crucial test of the two theories is then suggested, and it is shown that both the sub-aqueous contours of the lake-basins, and the superficial outlines of the lakes, are exactly such as would be produced by ice-erosion, while they could not possibly have been caused by submergence due to any form of earth-movements. It is submitted that we have here a positive criterion, now adduced for the first time, which is absolutely fatal to any theory of submersion.

Lastly, the special case of the Lake of Geneva is discussed, and it is shown that the explanation put forth by the anti-glacialists is wholly unsupported by facts, and is opposed to the known laws of glacier motion.

The *Contemporary* is included among the magazines that we have received, and to it Mr. Herbert Spencer contributes a rejoinder to Prof. Weismann. "As a species of literature," he remarks, "controversy is characterised by a terrible fertility. Each proposition becomes the parent of half-a-dozen, so that a few replies and rejoinders produce an unmanageable population of

issues, old and new, which end in being a nuisance to everybody." If this opinion had come from anyone but one of the debaters it would have been ungracious. The questions at issue between Weismann and Spencer and Romanes have become so involved that some discrimination is required to unravel the tangled skein of argument. Mr. Spencer therefore confines his replies to those arguments of Prof. Weismann which are contained in his first article. The following points are of interest:—

Prof. Weismann says he has disproved the conclusion that degeneration of the little toe has resulted from inheritance of acquired characters. But his reasoning fails against an interpretation he overlooks. A profound modification of the hind-limbs and their appendages must have taken place during the transition from arboreal habits to terrestrial habits; and dwindling of the little toe is an obvious consequence of disuse, at the same time that enlargement of the great toe is an obvious consequence of increased use.

The entire argument based on the unlike forms and instincts presented by castes of social insects is invalidated by an omission. Until probable conclusions are reached respecting the characters which such insects brought with them into the organised social state, no valid inferences can be drawn respecting characters developed during that state.

A further large error of interpretation is involved in the assumption that the different caste-characters are transmitted to them in the eggs laid by the mother insect. While we have evidence that the unlike structures of the sexes are determined by nutrition of the germ before egg-laying, we have evidence that the unlike structures of classes are caused by unlikenesses of nutrition of the larvæ. That these varieties of forms do not result from varieties of germ-plasms is demonstrated by the fact that where there are varieties of germ-plasms, as in varieties of the same species of mammal, no deviations in feeding prevent display of their structural results.

Mr. Spencer also shows that for such caste-modifications as those of the Amazon ants, which are unable to feed themselves, there is a feasible explanation other than that given by Prof. Weismann. With regard to panmixia, he says:—

The tacit challenge I gave to name some facts in support of the hypothesis of panmixia—or even a solitary fact—is passed by. It remains a pure speculation having no basis but Prof. Weismann's "opinion." When from the abstract statement of it we pass to a concrete test, in the case of the whale, we find that it necessitates an unproved and improbable assumption respecting *plus* and *minus* variations; that it ignores the unceasing tendency to reversion; and that it implies an effect out of all proportion to the cause.

It is curious what entirely opposite conclusions men may draw from the same evidence. Prof. Weismann thinks he has shown "that the last bulwark of the Lamarckian principle is untenable." Most readers will hold with me that he is, to use the mildest word, premature in so thinking.

A short article on "Water Bacteriology and Cholera," by Mrs. Percy Frankland, appears in *Longmans' Magazine*. It deals chiefly with the value of sand filtration as a means of purifying water. The report of the cholera epidemic in Hamburg and Altona has strikingly proved that sand-filters offer a remarkable and obstinate barrier to the passage of disease organisms, as well as the ordinary harmless water bacteria. Here is a statement of the facts:—

These two cities are both dependent upon the river Elbe for their water-supply, but whereas in the case of Hamburg the intake is situated *above* the city, the supply for Altona is abstracted below Hamburg *after it has received the sewage of a population of close upon* 800,000 *persons*. The Hamburg water was, therefore, to start with, relatively pure when compared with that destined for the use of Altona. But what was the fate of these two towns as regards cholera? Situated side by side, absolutely contiguous in fact, with nothing in their surroundings or in the nature of their population to especially distinguish them, in the one cholera swept away thousands, whilst in the other the scourge was scarcely felt; in Hamburg the deaths from cholera amounted to 1,250 per 100,000, and in Altona to but 221 per 100,000 of the population. So clearly defined, moreover, was the path pursued by the cholera, that although it pushed from the Hamburg side right up to the boundary line between the two cities, it there stopped, this being so striking that in one street, which for some distance marks the division between these cities, *the Hamburg side was stricken down with cholera, whilst that belonging to Altona remained free.* The remarkable fact was brought to light that in those houses supplied with the Hamburg water cholera was rampant, whilst in those on the Altona side, and furnished with the Altona water, not one case occurred. We have seen that the Hamburg water, to start with, was comparatively pure when compared with the foul liquid abstracted from the Elbe by Altona, but whereas in the one case the water was submitted to exhaustive and careful filtration through sand before delivery, in Hamburg the Elbe water was distributed in its raw condition as drawn from the river.

Also in *Longmans'*, Sir John Evans writes on "The Forgery of Antiquities." From his history of ingenious frauds perpetrated in every branch of archæology we select the following:—

Of prehistoric antiquities, both in stone and bronze, forgeries are numerous, but it seems needless to enter into all the details of their character, and of the means that may be employed to detect their fraudulent origin. Suffice it to say that in the gravel-pits of the valley of the Somme and of the neighbourhood of London the manufacture of palæolithic implements takes rank as one of the fine arts. The chipping of the English forgeries is superior to that of the French, but in each case the lanceolate form is the favourite. The appearance of antiquity is usually given by a thin coating of fine clay, but at Amiens a plan of whitening the flint by long boiling in the family kettle has been introduced. . . . In some of the bone-caves of the Reindeer period, both in France and Germany, ancient bones have had designs engraved upon them by modern forgers, and ancient flint tools have been inserted in sockets of ancient bone so as together to form a composite falsification. Something of the same kind has been practised with regard to relics from the Swiss lake-dwellings, many of the bronze objects from which have also been imitated by casting.

Of neolithic implements forgeries are equally abundant, and in some instances equally difficult to detect. Large perforated axe heads when made of soft sandstone which could not possibly be used for cutting purposes, of course betray themselves; but the modern flint axes and arrowheads are not so easily distinguishable from the ancient. To the experienced eye there is, however, a difference both in the workmanship and the character of the surface, the ancient arrowheads having probably been worked into shape by pressure with a tool of stag's horn, and not by blows of an iron hammer. The grinding of the edges of modern imitations has usually been effected on a revolving grindstone; in ancient times a fixed stone was always used, on which the surface and edges of axes or hatchets were ground by friction.

"A Naturalist's Notes off Mull," by "Nether Lochaber," in *Good Words*, is a chatty account well worth reading.

Blackwood's Magazine contains a paper by Prof. Andrew Seth on "Man's Place in the Cosmos," being a criticism of Prof. Huxley's Romanes lecture on "Evolution and Ethics." Mr. J. Bickerdyke writes on "Successful Fish-culture in the Highlands." He explains some of the facts and principles which should be understood and considered before Highland fish-culture is attempted, and illustrates his subject with an account of some experiments made by Mr. Stewart at Kinlochmoidart.

An article on "Anthropometry as Applied to Social and Economic Questions" is contributed by Mr. C. Roberts to the *Humanitarian*. In it we note that the mean height of Fellows of the Royal Society is given as 5 feet 9·76 inches.

We have also received the *National Review* and the *Century*, but neither contains any articles of scientific interest.