might not exert the same educational influence in New York as is put forth by the Royal Institution of Great Britain in London, in which a course of as many as eighty lectures of more or less popular interest has been given in a single season.

The brief experience which the Scientific Alliance has already had has convinced the members that a still closer union of the societies is necessary to the most effective accomplishment of their purpose, and this feeling has taken the form of an earnest movement for obtaining a permanent building as a home for all the societies. A building committee was appointed in October last, and has held several meetings and done much towards developing plans for the accomplishment of the object mentioned.

In the main these plans embrace the idea of the erection of a building, in the central part of the city, large enough to afford each society rooms for its ordinary meetings, for its library and collections, as well as facilities for research, and also to contain a lecture-hall, capable of seating twelve hundred people, to be used by all the societies in their public work. It is part of the aim of the Council to obtain, ultimately, if not at once, in connection with the proposed building, a fund for its maintenance and for the endowment of original research and publication.

It is hoped and believed that at this time, when public spirit appears to be undergoing a revival in New York, and numerous worthy objects are receiving generous aid and establishment by men of wealth, the cause of science will not be overlooked or neglected. Music and other fine arts and various charities have recently received munificent assistance in the very direction in which the Alliance is looking for aid,— namely, the erection of buildings suited to their particular needs,— and it seems reasonable to think that the man, or men, will soon be found with sufficient appreciation of scientific research, for both its educational and its practical value, to place it in a position as solid and substantial as that now likely to be occupied by the fine arts and by organized benevolence.

ACTINISM.

ON studying the nature of the action of the blue, or rather the violet, ray of the spectrum, it appears to me to be a misnomer to refer to it as chemical. The absorption of heat attends chemical decomposition, and on the other hand the disengagement of heat is the accompaniment of chemical combination. We read in Professor Wurtz's excellent treatise on "The Atomic Theory:" "It is heat which sets the atoms in motion; they have absorbed heat in separating from each other, since the rupture of the molecular equilibrium which marks the end of the state of combination has required the consumption of a certain quantity of heat. The heat thus absorbed has restored to the atoms the energy which they possessed before combination, and which represents affinity. This heat is lost again whenever the atoms, passing into the sphere of action of other atoms, fix the latter in some manner or are fixed by them so as to form new systems of equilibrium — that is, new molecules — in which henceforth their vibration and motion are preserved. This action is reciprocal." If with this we compare what takes place in the so-called chemical action of the violet ray, we find a great difference. The latter process is usually referred to as one of decomposition and not of combination, and, in fact, photography is based on the property possessed by light of decomposing chemical compounds by its reducing action.

It is true that this decomposition is supposed to be attended with certain chemical changes, as is the case also with the decomposition of amyl and other vapors in Dr. Tyndall's very interesting experiments in cloud making, although there appears to be some doubt as to the nature of the changes. Moreover, in the action of the violet ray on a mixture of chlorine and hydrogen gases the formation of hydrochloric acid would seem to be due to the operation of chemical affinity. Nevertheless, when we consider the analogy between this case and that of the formation of water by the passage of a current of electricity through a mixture of oxygen and hydrogen gases, a question may be raised as to whether the former is due to strictly chemical action. The phenomenon of electrolysis, in which the electric current decomposes a molecular compound, is, moreover, analogous to that of the decomposition of chemical compounds by the actinic action of the violet ray. The latter phenomenon answers to the decomposing action of heat, and the former to the combination of elements which attends chemical action; but they are not the same. This is evident from the fact that, while in the one case the combination precedes the discharge of heat on which decomposition depends, in the other case it follows decomposition.

Nevertheless, in all cases actinic action would seem to be attended with the aggregation of at least one element of the decomposed chemical compound. Thus, when on the exposure of chloride of silver to the action of light the chlorine is expelled, the silver is precipitated. The result depends on the instability of the equilibrium of chemical combination in the presence of certain light-rays, and it is thought that all substances are thus more or less affected by light. It is found that the red rays are chemically inactive, and of the others the absorbed rays are those which bring about the decomposition which is the basis of actinic action. The liquid nitrite of amyl allows the transmission of the yellow rays, and Dr. Tyndall states that the blue rays, as complementary to the yellow, are absorbed, and therefore that they produce the "chemical" effect. As a fact, however, the complementary of yellow is violet, and the greatest actinic action is in the violet ray, and it extends far beyond into the invisible rays. This in itself would seem to prove that actinism is not chemical action, as the intimate relation between this force and heat would lead us to expect the association of chemical action with rays towards the red end of the spectrum. The vibrations of heat are atomic and not molecular, and possibly this fact may have influenced Dr. Tyndall in his opinion that the absorption of the actinic rays occurs in the main within the molecule, and are not the act of the molecule as a whole. There is no reason, however, why the absorption should not be of the whole molecular mass; that is, of the body of molecules that make up the mass, just as the absorption of heat is that of the atoms which make up the molecule.

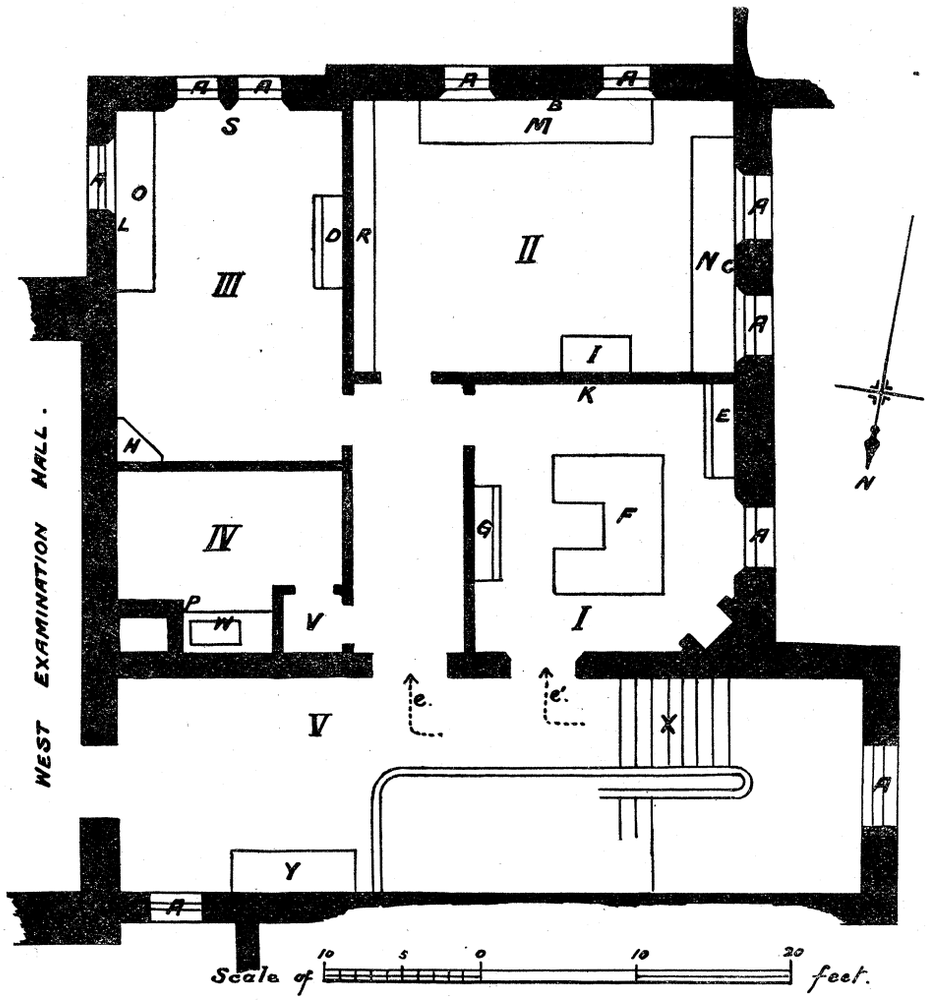
Here would seem to be the real explanation of the phenomena of actinism, which is a distinct power of light due to its activity as a molar energy, just as heat is an atomic energy. The combination which follows the decomposition effected by actinic action has a similar relation to chemical combination. The latter is atomic, whereas the former is molar, as it affects the mass, and this through its molecules and not through the atoms of which these are composed. From the fact that the electric light contains a large proportion of actinic rays, and that the electric spark in rarified air is diffused and of a violet color, it might be supposed that actinism is only a phase of electricity. That they are closely

related we may judge by what was said above, but there are reasons for believing them to differ from each other as they both differ from heat, although all alike are forms of energy. Actinic absorption, like coloric absorption, is attended with decomposition, but so far as the former is attended with or followed by an aggregation or combination of elements, as with chemical affinity, it is also a force, but molar rather than molecular or atomic. In distinguishing between these forms of matter, I adopt the principle laid down by Mr. Grant Allen, although not all the applications he makes of them, and I believe that in the recognition of the truth of those principles will be found the solution of many scientific problems.

C. STANILAND WAKE.

THE PSYCHOLOGICAL LABORATORY IN THE UNIVERSITY OF TORONTO.[1]

IN the spring of 1891 an appropriation of $1,100 was made for the equipment of a laboratory for experimental psychology at the instance of the writer. A suite of rooms, of which the accompanying cut gives the dimensions and arrangement, was set apart for the use of this department. The laboratory is located at the west end of the restored University College building on the first (not the ground) floor. It is isolated entirely from the general work of the building, being over the rooms of the physical department. The rooms have light exposure from three sides. The room which is used for students' demonstration and practical work (I. in the plan) is cut off from the research rooms, thus making interruptions to the latter from noise, etc., unlikely. For the same reason, the central hall is laid with cocoa matting. The work-tables of the research rooms (II. and III.) get light from the east, south, and west, a variety which is of great value, especially as the east exposure (Room III.) has reflected light from the walls of the main building (this is also partly the case with the light from the west windows, Rooms I. and II.). The rooms are artificially lighted by combination gas and electric chandeliers from the ceilings, and have besides movable incandescent lamps over the work-tables. The dark room is also furnished with incandescent lights. The floors throughout are carefully laid in hard wood. The



A, A, A, Windows.

I. Demonstrating-room and work-room for undergraduates. G. Work-table; E. Book-cases; K. Blackboard; F. Demonstration-table; e'. Students' entrance; e. Professor's entrance.

II. Research-room. M, N. Work-tables; B, C. Lockers, movable incandescent lights; I. Chart-case, movable tables; R. Instrument-cases.

III. Professor's Research-room. O. Work-table; D. Book-cases; H. Closet for tools, &c ; L. Movable incandescent light, lockers; S. Writing-desk.

IV. Dark-room. W. Sink; V. Vestibule; P. Incandescent light.

V. Private hall. X. Stairs; e. Professor's entrance; Y. Instrument-cases.

[1] The accompanying plan is published at the suggestion of several psychologists who have borrowed and examined it; it is thought that the details may be of use to professors, boards, or trustees who are contemplating the providing of laboratories.