SCIENCE:

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES

PUBLISHED BY

N. D. C. HODGES,

47 LAFAYETTE PLACE, NEW YORK.

SUBSCRIPTIONS.—United States and Canada..... $3.50 a year.
Great Britain and Europe..... 4.50 a year.

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

THE DESTRUCTION OF THE WAVE THEORY.

AT brief intervals of time the scientific world is startled by the announcement that some one of its favorite and supposed permanent and well-established theories in science is annihilated by a new genius in the field of research. On investigation, however, it has thus far invariably proved that the supposed iconoclast is slightly in error; and the theory usually stands firmly until another bold martyr appears to shake but not to overthrow it. The last of these brave but unknown and unknowing martyrs to science, as we fear, may be found quixotically attacking the wave theory of sound in the columns of the *Monthly Journal of the British Society of Musicians*, in the issues of March and April.

Mr. George Audsley supports the "substantial" theory of sound with courage, if not with knowledge and discretion, and puts to flight such advocates of the old notion of vibration as Professor Tyndall in Britain and Professor Mayer in America; at least, those gentlemen seem not to have remained on the field of battle. Mr. Audsley points out the fact that the stridulations of the locust affect the air for miles around, remaining audible even when reduced four thousand millions of times, and takes this as ample and positive proof of the folly of the accepted theory, a *reductio ad absurdum*, in some sense, certainly, beyond the suspicion of a question. Unfortunately he has no exact measurements and no accounts to give us of experimental research to sustain his onslaught; but that fact seems to him unimportant.

Scientific authority in the United States comes to the support of Mr. Audsley also. "Professor" E. J. Drake, presumably an authority, and accomplished in experimental investigation, — although we lament that we must confess our ignorance on this subject, never having heard of these "authorities" at such meetings of the learned societies as we have had the good fortune to attend, — gives Mr. Audsley the benefit of his victory over Professor Tyndall, and the "startling" results of experiments at the Pennsylvania Military Academy by Capt. Carter as related to Professor Tyndall, without, unfortunately, convincing that hard-headed "scientist," who replies only thus: "You may go to rest with the assurance that the wave theory of sound is perfectly secure."

Mr. Sedley Taylor ventures to mildly uphold the endangered theory, however, and presents very admirably what little can be said in favor of the sound-wave; but both he and Tyndall, and presumably Mayer, are met by the somewhat intimidating accusation of "scientific cowardice," and, it is feared, may be driven from the field, leaving the sound-wave theory to stand as best it can.

Nevertheless, every one studying the physical sciences will be interested in learning who these bold soldiers of a forlorn hope be, and what is the experimental evidence on which they rely. Truth must in the end prevail; and it is only necessary to secure experimental evidence of the new ideas to insure their acceptance. Facts, not words, are needed. What man of science of known ability and experience in research will be the first to prove the material theory of energy-transmission through elastic substance? Messrs. Audsley and Drake are with him, and will bravely claim for him deserved honor.

If we may venture the suggestion, however, to such able and learned men as are engaged in this grand crusade, we would modestly intimate the possibility that the trouble is not so much with the wave or any other "theory" as with the facts; not that one or another explanation of the *modus operandi* is unsatisfactory, but that a minute insect can, by any natural process, shake such enormous masses. Is it not, after all, a miracle which our bold crusaders have discovered?

UNIVERSITY EXTENSION. — HISTORY OF THE PHILADELPHIA LOCAL MOVEMENT.[1]

THE success of the university extension movement in England has been closely watched by those interested in higher education in this country for a number of years; but, as the problems here presented were in many respects radically different, there has been a great feeling of hesitancy anent the initiation of the work in this country.

Before any general movement was attempted, it seemed advisable that an experiment should be made in some one place, and a thorough test had. To secure this end, an informal meeting was held in Philadelphia early in the spring of 1890, at the request of the provost of the University of Pennsylvania, to discuss the feasibility of transplanting the English system. It was seen at once that Philadelphia and its immediate vicinity offered, as a place in which to try the experiment, advantages possessed by no other. Here was a compact city made up of parts originally independent; here were in close proximity not only flourishing suburbs, but a large number of towns and villages; and last, but not by any means the least important, in this field, there were found more institutions for higher education with which it would be possible to co-operate than in any other section of the country.

Immediately it was resolved to make the experiment, and the first step was the organization of the society. The co-operation of the teaching bodies in and adjacent to the field was asked, and it became evident from the hearty responses received on all hands that there would be sufficient teaching force available for the work. The next step was to invite the co-operation of existing bodies interested in liberal culture. Again the hearty responses received, in a measure foreshadowed the successful inauguration of the work.

It was then resolved to send the secretary abroad to make a study of the movement at its fountain head. During his sojourn in England, he made a careful examination into the plans of organization and method of work of the Cambridge Syndicate, the Oxford Delegacy, the Victoria University, and The London Society for the Extension of University Teaching. Upon his return

[1] From Bulletin No. 1 of the American Society for the Extension of University Teaching.

in the fall, he drew up a careful report, which was printed, and may be had on application. The organization of the "local centres," as they are called, was at once actively entered upon.

In organizing these local centres, the society endeavors to cooperate with, and as far as possible work through, existing institutions. In almost every case we have found some organization which possessed a hall, and was willing to take up the work, and to grant the use of the hall rent-free. The first centre established was that at Roxborough, in connection with the St. Timothy's Workingmen's Club and Institute. They opened their first course on chemistry on the 3d of November, 1890.

The following is a list of the centres that have been established, and the courses in progress at the same: Wagner Institute, zoölogy, chemistry, geology, psychology, and two courses in English literature; Association Local Centre, in connection with the main branch of the Young Men's Christian Association, astronomy, biology, higher mathematics, and two courses in English literature; West Philadelphia, American history and English literature; Frankford, American history and English literature; Holmesburg, American history and English literature; Germantown, English literature and electricity; Spring Garden, mathematics and two courses in English literature; Wissahickon Heights, English literature and European history; South Broad Street, American history and electricity; Women's Christian Association, biology; United Club and Institute, English literature; Norristown, two courses in English literature; Camden, N.J., English literature; Lansdowne, electricity; Media, English literature; Haddonfield, N J., European history; Newark, Del , English literature; Mount Holly, N.J., American history; Downingtown, Penn , English literature; Trenton, N.J., English literature; Wilmington, Del., English literature.

To summarize what has been done thus far, there have been forty courses, with an average attendance of 9,250 (estimated), and two hundred and fifty lectures, with a total attendance of 55,500 (estimated).

Applications for the formation of local centres have also been received from Salem, N.J.; Bryn Mawr, Penn.; Reading, Penn.; Bristol, Penn.; Gloucester, N.J.; Woodbury, N.J.; Woodbourne, Penn.; Williamsport, Penn.; Wilkesbarre, Penn.; West Chester, Penn.; Lebanon, Penn.; Towanda, Penn.; Collegeville, Penn.; Rahway, N.J.; Doylestown, Penn.; Hazleton, Penn.; Lancaster, Penn.; Bridgeton, N.J ; Pottstown, Penn; North Wales, Penn.; and Staten Island, N.Y.

The courses vary in length from six to twelve lectures. The method adopted is, first, to have the lectures last about an hour, after which the students form themselves into a class to pursue the subject further. In connection with each course there is issued a syllabus, giving a full outline of the lectures, together with suggested lines for collateral reading. In addition to this, it also contains at the end of each lecture a series of exercises, which the student prepares at home and mails to the lecturer, who returns them at the following class with his comments noted on the margin. At the end of each course an examination is held, upon the basis of which, together with the weekly paper work, certificates are awarded.

This short statement gives the public a fair idea of our general work as we have entered upon it and carried it out. It is hoped that general interest will be felt in this plain statement of facts regarding a novel attempt at higher education with its surprisingly successful results. We desire also to state what is our main aim in this university extension work. It has been too long the system to keep university forces, teaching, and methods shut up entirely within classrooms, and to leave the great mass of people without the opportunities of having their minds fertilized with great thoughts, their studies carefully guided, and their knowledge lifted from a lower to a higher plane by this systematic university teaching; for it must be noted especially that the teaching contemplated in this movement is of real university grade, conducted by teachers of the first rank, and by methods which have proved themselves capable of giving results fairly comparable with those obtained within academic halls.

We propose, then, to carry this university work out into the general community as far as practicable. It will afford to all, however pressed with practical duties, or hindered by lack of funds, the opportunity of acquiring recent and exact knowledge, and of sharing in the stimulating discipline of genuine educational methods. These methods adopted by the society are flexible, and well adapted to the objects in view.

The society aims to make its local centres self-supporting. With proper efforts at each centre, this can usually be accomplished; but it is evident, that despite this, and despite the generous cooperation of many eminent teachers, large expenditures of money will be required.

We are happy to announce that the continuance of the work is secured by a liberal guaranty fund for five years. It is, however, believed that all will recognize this new national educational movement as judicious as well as generous, and that its claims will appeal forcibly to very many minds. It is earnestly hoped that all who realize its importance will become members of the society, and assist in the development of the work.

MICHIGAN STATE SANITATION.

THE annual meeting of the Michigan State Board of Health was held April 14 1891. Professor Fall, Drs. Avery, Hazlewood, Vaughan, and Baker, were present. Dr. Avery was re-elected president. Dr. Vaughan reported that at the State Laboratory of Hygiene he has made analyses of all the different kinds of baking-powder found in the market, also of one hundred and twelve samples of water from different parts of the State, and that he was ready to report the results, also of his researches on typhoid-fever. Dr. Baker reported that he had worked out the cause of influenza. He said its greatly increased prevalence during the last three months is alarming, because so many other diseases follow that disease, and increase after it increases; the diseases which so increase being consumption, pneumonia, cerebro-spinal meningitis, rheumatism, osteo-myelitis, etc., influenza seeming to bring in its train all of these most important diseases. Dr Baker explained the causation of influenza. He stated that the germs of influenza are generally at all times present, and the germs of pneumonia, tuberculosis, and of the other specific diseases are somewhat widely disseminated, but that there must be certain coincident meteorological conditions to irritate the throat and air-passages sufficiently to let the germs gain an entrance to the body. These meteorological conditions, in this instance, were the excessive prevalence of north and north-east winds, and the excessive amount of ozone during the past three months. The prevention of influenza, and of the coincident rise in the other more dangerous diseases, has not been possible, because of ignorance of the causes. Now the causes are known, and the study of the measures for the prevention can begin. How to get more thorough disinfection after contagious diseases, was brought up by Dr. Hazlewood, also by letter from Dr. Nicholson of the Upper Peninsula, and also by other correspondence of the office of the board It seems to be made plain, that, if the bill now before the Legislature (Senate Bill 257, House Bill 640) shall become a law, making a small appropriation to enable the State Board of Health to send an inspector to the localities where most needed, to aid in the final disinfection after cases of dangerous diseases, the spread of those diseases can be very greatly lessened, and hundreds, and possibly thousands, of lives can be saved in Michigan in every year.

PORCELAIN INDUSTRY IN FRANCE.

THE United States consul at Limoges says, in his last report to the United States Government, that the proprietors of the large porcelain-factories there have been for a long time studying the question of reducing the price of fuel. At a recent congress of the manufacturers, it was said that some new and cheap way of manufacturing porcelain must be found for France, or the industry which has become so famous, and which employs so many of the inhabitants, would be driven from French soil on account of the cost of firing. It was there ascertained that the cost of firing china in Bohemia was not more than 10 francs a ton; in England it was only 13 francs; while, for the same thing in France, at Limoges, the cost was between 34 and 35 francs. This difference