

Be this as it may, the idea of Daniel Bernoulli has been developed into a beautiful theory—the kinetic theory of gases—a theory which has shed a sudden clearness, an unexpected light, on matters which seemed to be veiled in the deepest obscurity. The molecules, as already stated, are invisible. Nevertheless, attempts have been made to penetrate this invisible world by the force of scientific reasoning, and by an effort which does honour to the human mind, even if it be destined to remain barren. The illustrious authors of the kinetic theory of gases have sought to determine, not only the velocities of the gaseous molecules, and the prodigious number of their collisions during a unit of time, but likewise their distances, their absolute dimensions, and their number in a given volume. And here we arrive at results which bewilder the imagination, but which, in this lecture, I must not attempt to unfold.

Permit me only to add that these great labours mark a resting place in our course, and are, perhaps, an approach towards the solution of the eternal problem of the constitution of matter—a problem which dates from the earliest ages of civilisation, and though discussed by all the great thinkers of ancient, as well as of modern, times, still remains unsolved. May we not hope that in our own time this problem has been more clearly stated and more earnestly attacked, and that the labours of the nineteenth century have advanced the human mind in these arduous paths, more than those of a Lucretius, or even of a Descartes and a Newton. From this point of view, the discoveries of modern chemistry, so well expressed and summarised by the immortal conception of Dalton, will mark an epoch in the progress of the human mind; and to one of the most important among these discoveries—that of the liquefaction of the gases—grateful posterity will for ever join the glorious name of FARADAY.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

BIOLOGISTS will be pleased with the frank recognition of Dr. Foster's services contained in the statute proposed by the Council of the Senate at Cambridge for the new Professorship of Physiology to be founded by Trinity College. It is to be permanently recorded that Dr. Foster's lectures have always been open to the entire University, and that he "has successfully promoted" the study of physiology. Thus the continued self-denying effort and enthusiasm which have in eight years developed a school of over seventy students, and which have called forth the original talents of a score of ardent young investigators, will find still fuller scope. We understand that Dr. Foster resolutely declined to sanction any arrangement by Trinity College to secure for him the first tenure of the professorship, preferring to leave the University perfectly unfettered in its choice. But the Council of the Senate, which is a thoroughly representative body, chooses to signify the inseparable connection of the work with Dr. Foster's name by the very wording of the statute. The professor is to be elected by a board consisting of the Vice-Chancellor, of four members nominated by the Council, and four nominated by the Board of Natural Science Studies. One of each four must be neither resident in the University nor officially connected with it.

THE Cambridge mechanical workshops, organised by Prof. Stuart, bid fair to become of importance to research in the country generally, as well as in Cambridge. Prof. Stuart, on his own responsibility, has completely fitted up the workshops with all machinery necessary for the construction of philosophical apparatus. He has engaged a number of the most competent workmen as teachers, and to construct apparatus required by professors and investigators who are often deterred from researches because of lack of appliances or time to make what they want. Classes are formed for the regular instruction of university men in the use of tools and the construction of machines, and these are attended at present by a dozen students, several of whom intend to become engineers.

MR. A. C. HADDON, of Christ's College, has been nominated by the Board of Natural Sciences Studies, Cambridge, to study at the Zoological Station at Naples during the ensuing season.

DR. GREENFIELD, of St. Thomas's Hospital, has been appointed by the Senate of the University of London to succeed Dr. Burdon Sanderson as Professor of Comparative Pathology at the Brown Institution.

THE subscriptions already received or promised for the extension of the buildings of University College, London, amount to upwards of 14,000*l.*

By the will of the late Mr. Charles Randolph, engineer, 60,000*l.* has been left to the building fund of Glasgow University.

THE third annual report of the Johns Hopkins University, Baltimore, issued by President Gilman, is of the highest interest, and shows that the attempt to establish a purely philosophical university has been eminently successful. Our readers are no doubt familiar with the principles on which this institution has been based. It was not sought to add one more to the many colleges already existing in the United States, but to found a genuine university in which those who had the inclination and the capabilities would have every facility for carrying their elementary or collegiate studies into the region of research in the various departments of human knowledge. The method of work has been carefully planned; the best men obtainable have been got to superintend the work of the students, who are admitted only on showing that they are really able and willing to pursue the courses which have been arranged. It is a many-sided and active centre of the highest learning, and cannot but have an invigorating result on science in all its departments in the United States. We would recommend those of our readers interested in the higher education to procure a copy of this report, which deserves a more detailed notice than we have space for.

THE Budget for Public Instruction will be deposited this week in the Bureau of the French Chamber of Deputies. A large increase is asked for in favour of public instruction. The credit granted will exceed two millions sterling. In 1823 it was only two thousand pounds, consequently in a little more than half a century it has been multiplied a thousand-fold. M. Bardoux will propose the creation in each department of a high school for popular education according to the models which have proved so successful in Paris. The benefit of the organisation realised in the capital will be extended to the whole of France if the scheme of the active minister is adopted, as will most probably be the case.

AT Stockholm the "Free" University was opened on October 14 last. The funds collected for its foundation now reach the sum of 820,000 Swedish crowns. It is intended to establish a similar university at Gothenburg.

SCIENTIFIC SERIALS

The American Journal of Science and Arts, October.—Besides two valuable papers by Professors Mayer and Draper, reproduced in our columns, we have here an account of the curious artificial mounds of North-Eastern Iowa, by Mr. McGee. They consist of tumuli, smaller conical mounds, embankments, and animal mounds, and from numerous measurements the builders seem to have used a unit which either was, or grew out of, the pace or yard. A slow southerly migration of the mound-builders is supposed to explain the evident increase in geometrical knowledge attested by various works found in passing across the United States from north to south.—Prof. Young furnishes details of observations of the Princeton Eclipse Expedition.—The flour-mill explosion at Minneapolis in May was probably due to the running dry of a set of stones which ground middlings, one of six sets discharging into a spout which communicated with a dust-house. Mr. Peckham studies the case, pointing out that there is greater danger with middlings, because it is dryer, and is ground at a higher temperature, and finer. The dry stones may heat the last part of the grist remaining, sufficiently to make it like tinder, so that it readily ignites on receiving a spark from the stones. The practical problem is how to prevent or detect dry stones, especially those for middlings.—Mr. Becker indicates the *rationale* of correction for vacuum in chemical analysis.—Prof. Smith writes on the composition of the new meteoric mineral, Daubreeilite, and its frequent, if not universal, occurrence in meteoric irons.—Prof. Watson gives a more careful determination (than previously) of the intra-Mercurial planets.

Annalen der Physik und Chemie.—No. 9, 1878.—The excitation of electricity on contact of solid and gaseous bodies, forms the subject of an opening paper by Herr Beetz, who thinks the case is either one of differences of tension; produced by different conducting liquids, or of change of metals by gases which have ceased to be in the gaseous state, either through occlusion in the metals, or condensation on their surface.—From experiments on production of