that the fibrine filaments were formed by a disintegration of the white corpuscles. On the other hand, these corpuscles seem to be stable elements. As a matter of fact, no observer has claimed ever to have seen the actual change of a corpuscle into fibrine.

The process of coagulation can also be studied in a fine capillary tube. The clot forms in the centre, and the serum outside. The white corpuscles seem to be squeezed out of the clot, or to migrate from it.

Landois, whose observations were made some ten years ago, thinks that the red corpuscles are connected with the formation of fibrine.

But the most interesting of all the problems is the relation of the blood-plaques to this process of coagulation. In blood drawn from the vessels we see fine filaments shooting out radially from the granule masses of Schultze, — those masses which we have already learned are collections of the blood-plaques. Ranvier, in 1873, regarded these as the centres of fibrine formation. The fibrine certainly does stand in a thick, dense network about these masses. In healthy blood, fibrine also appears entirely independent of the plaques. The filaments are fine, and appear much like margarine crystals. These filaments may be especially dense near the plaques; but any one can satisfy himself, by examining the blood in the moist chamber, that the fibrine forms independently of them as well. If we pass a ligature through the femoral vein of a dog, and allow it to remain for five minutes, particularly if we have separated the threads of the ligature, and then examine it, we shall find it coated with blood-plaques. If the blood of a dog is received into a cup, and this is whipped with a brush of threads for five minutes, we have the same aggregation of the plaques upon the threads: some white corpuscles will also be found, but the plaques are the striking feature. If these threads are dipped into a solution containing a coagulable substance, clotting will at once take place. The greater the number of blood-plaques, the denser and firmer will be the clot.

Still more instructive and interesting is the study of thrombosis, or clotting in the blood-vessels. If a dog is bled to death through a cut in the femoral artery, and the vessel excised and placed in osmic acid, and subsequently examined, we shall find on the cut edges and in the lumen of the vessel a finely granular material, and outside of this a darker mass composed of red corpuscles. The inner portion, the finely granular material, however, which is in contact with the elastic lamina, is composed of blood-plaques, and not white corpuscles. These plaques are the first elements or factors in the formation of a thrombus. Eberth, in Virchow's 'Archives,' has just shown that the first elements to settle and to lodge on lacerated vessels are blood-plaques. In all white thrombi these plaques seem to make up their bulk. If a needle is passed through a blood-vessel in the omentum of a living animal, the first elements which collect at the point of injury are the blood-plaques, and a distinct white thrombus is formed. These observations on the relation of the plaques to coagulation have been made by Bizzozero, Hayem, and Eberth.

In the circulating blood the plaques keep with the red corpuscles. If we examine a vessel of the omentum of the rabbit or guinea-pig, we shall see only a red streak, which occupies the central part of the vessel. In the space between this and the wall of the vessel, in the still layer as it is called, we may occasionally see a few colorless corpuscles. If the circulation now becomes slower, we shall see the plaques in the still layer with these colorless corpuscles. If atheromatous ulcers of the aorta are examined, it will be found that the material which has collected upon them is made up of blood-plaques: the same is true of the vegetations found upon the valves. While the distinct plaque form is apparent in the superficial parts of these structures, and the same is true of white thrombi, the deeper parts are also plaques, but in a granular state of disintegration.

Eberth has shown, that while, in the rapidly circulating blood, the corpuscles and plaques are together, yet, if acid is placed on the edge of a vessel or laceration, the plaques collect, and form a definite aggregation or white thrombus. We frequently find in autopsies atheromatous ulcers or calcareous plates which have no thrombi: in these cases, the circulation during life having been rapid, the plaques remained central; but, as the current becomes slower, these plaques become peripheral, and adhere to surfaces denuded of endothelium, and thrombi result.

LONDON LETTER.

IMPORTANT changes are in progress at Oxford which will give the university a real faculty of medicine. It has hitherto conducted medical examinations for graduates in arts who have obtained their professional education elsewhere, generally at one of the great London hospitals. But in future Oxford men will be able to enter the university as medical students, as has long been the case at Cambridge. It will still be necessary for them, however, to graduate in arts, which will practically mean in the school of natural science, before they can proceed to a medical degree; and,

as the exemption of natural science men from the classical examination known as 'moderations' will shortly come into operation, there will be no difficulty in this respect. A skilled anatomical teacher, Dr. Arthur Thomson, has been imported from Edinburgh; and the names of Profs. Bayley Balfour, Burdon Sanderson, and H. N. Moseley, are a sufficient guaranty that the preliminary training in botany, physiology, and zoölogy will be thoroughly efficient.

In the person of Mr. C. W. Peach, another member of the good old school of British naturalists has passed away. He began life as a coast-guardsman in the preventive service, and soon acquired an intimate knowledge of the marine fauna of the south of England. When not engaged in detecting smugglers, he devoted his energies to zoölogical and geological studies, and was rewarded by the discovery of many new species among the lower invertebrates, and also, a point of much more importance, of traces of fossil fishes in the Devonian rocks of Devonshire. Later on he received an appointment in Scotland, and his discovery of fossils in the altered rocks of the highlands proved to be one of the utmost value in the skilled hands of Sir Roderick Murchison. Mr. Peach's great powers of observation and rich store of knowledge were always at the service of professional scientific men. Lyell and Murchison, Forbes and Carpenter, Gwyn Jeffreys and Wyville Thomson, and many others, who are happily still with us, knew and valued him highly. His son, Mr. B. N. Peach, is a distinguished member of the geological survey of Scotland.

The American friends of the late Dr. Thomas Davidson may like to know that a fund is being raised by the mayor of Brighton for the purpose of placing some memorial of him in the museum of that town. It was the object of his constant care during the many years that he resided at Brighton, and it is felt that his services in the cause of science deserve some permanent commemoration. His library and large collection of brachiopods are now in the Natural history museum at South Kensington.

Some important statements which have been recently made in the house of commons indicate that the government is going to form a department of the board of trade which shall do for England what the fishery board of Scotland and the Irish commissioners of fisheries do for Ireland. It is hoped that this may be the first step towards the establishment of a definite board of British fisheries, analogous to the department of botany at Kew, the geological survey office, and other similar institutions. At the present time the English fisheries are not under the supervision of any professional naturalist whatever, and their interests suffer in consequence.

Although February last was the coldest on record in England, the first ten days of March were colder. Only once in that period, viz., at the Scilly Islands, off the south-west corner of England, was 50° F. recorded at any station in the British Isles. Nothing above 43° was recorded in London in that period, and from Feb. 19 to March 11 there was a frost every night in London. Though March, 1883, was the coldest March but two of this century, 52° was recorded on March 5 of that year. On March 19 the frost suddenly broke up, terminating the twenty-four days' continuous skating which had been enjoyed in a northern suburb of London; and since then the weather has been very mild.

The results of the experiments in the Pasteur laboratory are being watched with the keenest interest. One of the Russian moujiks, who had been bitten by a mad wolf, has died, but the others show no sign of disease. The children and other patients sent from Bradford (Yorkshire) have returned thither, and are loud in praise of the treatment they have received. It is rumored, as a result of the question in the house of commons mentioned in the last London letter, that the government intends to appoint a royal commission to investigate the question. The names of Sir James Paget, Sir W. Jenner, Dr. Lauder Brunton, Prof. Burdon Sanderson, and Sir H. Roscoe, are mentioned in this connection.

A very crowded audience assembled a few nights ago to hear a paper upon domestic electric lighting, by Mr. W. H. Preece, head of the electrical department of the general post-office. He expressed the opinion, that, although England was beaten by so many countries in the adoption of arc-lighting, she probably led the way in the domestic use of incandescent lamps. These, however, were all private and separate installations, many instances of which were given. The electric lighting bill of Lord Rayleigh, introduced into the house of lords on March 19, would, if it became law, remove the disabilities imposed by the act of 1882. Although the nomenclature and efficiency of glow-lamps was in a very unsatisfactory state, enormous improvements had been made in the dynamo since the expiration of the patent monopoly. It was now the most perfect existing converter of energy, and was one-third the price, and its output was trebled: hence it was nine times better than it was a few years ago, during the existence of the patent. A lively discussion followed the reading of the paper.

Mr. W. H. Christie, the astronomer royal, recently lectured at the Royal institution on uni-

versal time, in the course of which he paid a high compliment to the railways of the United States and Canada for having reduced the number of local times from seventy-five to five, by adopting the five standard meridians. The scheme of hourly meridians, however, could only be considered a provisional arrangement, which would ultimately lead to the adoption of universal time, for which he thought the name 'world time' would be the best. The 'world' day would commence at Greenwich, midnight, and count from 0 h. to 24 h. Among the authorities cited by Mr. Christie in support of the twenty-four hours system, was that of the president of the Western union telegraph company (U.S.A.), who considered, that, in addition to diminishing risk of errors, it would save the cost of a hundred and fifty million letters annually. W.

London, March 27.

NOTES AND NEWS.

THE fourteenth annual meeting of the American public health association will be held at Toronto, Ont., Oct. 5–8, 1886. The executive committee have selected the following topics for consideration at said meeting: 1. The disposal of the refuse matters of cities and towns; 2. The condition of stored water-supplies, and their relation to the public health; 3. The best methods and the apparatus necessary for the teaching of hygiene in the public schools, as well as the means for securing uniformity in such instruction; 4. Recent sanitary experiences in connection with the exclusion and suppression of epidemic disease; 5. The sanitary conditions and necessities of school-houses and school-life; 6. The preventable causes of disease, injury, and death in American manufactories and workshops, and the best means and appliances for preventing and avoiding them; 7. Plans for dwelling-houses. The local committee of arrangements at Toronto, Ont., have already actively begun the work essential to a large and successful meeting. In addition to the usual work incident to such an undertaking, they will extend invitations to foreign sanitarians, and secure such transportation facilities as will probably insure a good representation from abroad. Communications regarding matters of transportation or of a local character should be addressed to Peter H. Bryce, M.D., chairman local committee of arrangements, Toronto, Ont. Mr. Henry Lomb of Rochester, N.Y., who is already well-known through the prizes which he gave last year for the best essays on certain sanitary subjects, offers for the present year the sum of seventeen hundred and fifty dollars, to be awarded as prizes on the following subjects: 1. The sanitary conditions and necessities of school-houses and school-life, one prize, $500; 2. The preventable causes of disease, injury, and death in American manufactories and workshops, and the best means and appliances for preventing and avoiding them, one prize, $500; 3. Plans for dwelling-houses, — (*a*) A plan for a dwelling-house not to exceed in cost, exclusive of cellar, eight hundred dollars (prizes: first, $200; second, $100; third, $50; fourth, $25); (*b*) A plan for a dwelling-house not to exceed in cost, including the cellar, sixteen hundred dollars (prizes: first, $200; second, $100; third, $50; fourth, $25). Accommodations to be provided for families consisting of five persons. All essays and plans for the above prizes must be in the hands of the secretary, Dr. Irving A. Watson, Concord, N.H., on or before Aug. 15, 1886.

— The officers of Section D (mechanical science and engineering) of the American association for the advancement of science have issued a circular stating that the steadily increasing interest and importance of the meetings of Section D justify the expectation of a large attendance of engineers at the Buffalo meeting. The meetings of the American association offer to students of mechanical science and to engineers opportunities which cannot be elsewhere obtained, of conveniently meeting at one time a large number of gentlemen eminent in branches of science to which engineering is closely related, especially mathematics, physics, chemistry, geology, and economic science. The scope of this section is broad enough to include all branches of engineering. It occupies a field peculiar to itself, which by no means encroaches upon that of the various engineering societies, but rather adjoins and supplements it. These societies deal chiefly with accomplished practical results, while Section D affords an opportunity for the presentation and discussion of papers upon the application of scientific methods to every department of engineering. The object of the section, in accordance with the name of the association, is the 'advancement of science.' The following may be named as among the general classes of subjects which this section may properly consider within its scope: mechanical science in the abstract; mechanical research; problems in engineering of national importance, and such as are connected with more than one branch of engineering; the education of engineers; the relation of the government to engineers in civil life; the endowment and organization of mechanical research. The officers extend a cordial invitation to all to attend the meetings of the section, and to contribute such papers or discus-