exclude atmospheric nitrogen from the apparatus employed, the less becomes the apparent excretion of nitrogen by the animal. This, taken in connection with the similar fact already mentioned, regarding the results of experiments by the other method, is significant. If, as we increase the delicacy of our experimental methods, the apparent excretion of free nitrogen becomes less and less, it is not a very bold assumption which regards it as entirely due to the unavoidable errors of experiment. That such is the case is perhaps not proven, but the weight of evidence is decidedly in favor of that belief.

H. P. Armsby.

THE BRITISH NAUTICAL ALMANAC.

We have received promptly, as usual, the "Nautical almanac and astronomical ephemeris for the year 1888, for the meridian of the Royal observatory at Greenwich," the contents and arrangement of which are announced to be the same generally as those of the preceding year. We find no changes in the adopted astronomical constants, nor have any new prediction-tables been substituted for those which have now been employed for many years. The early Struve constant of aberration is not replaced by the recent Pulkowa determination, and Newcomb's mean equatorial horizontal parallax of the sun, 8.848″, is wisely retained. The fundamental elements of the moon's position in space are derived from Hansen's tables unaltered, and the apparent positions only are modified by Newcomb's corrections, — a method of procedure which seems to be best adapted to the needs of the future investigator.

For the first time in the history of nautical almanacs, the positions of all the great planets were derived from a uniform system of tables, and so published in the British 'Nautical almanac' for 1882; and the use of these same tables is still adhered to. These are the planetary tables constructed by the late Leverrier, and printed in the fifth, sixth, twelfth, and fourteenth volumes of the 'Annales de l'Observatoire impérial de Paris.' The derivation of the times of the phenomena of Jupiter's satellites is based on the 'Tables écliptiques des satellites de Jupiter, par le Baron de Damoiseau,' Paris, 1836. Professor Adams's extension of these tables, now employed in the British 'Nautical almanac,' will expire in two years more.

This ephemeris is now most deficient in its list of standard stars, the number and relative positions of those in the list being entirely inadequate to the needs of field and observatory work. Catalogues of stellar co-ordinates of high precision are now so numerous that there would seem to be no good reason why the British 'Nautical almanac' should hesitate in following the 'Berliner astronomisches jahrbuch,' the 'Connaissance des temps,' and the 'American ephemeris,' all of which have within a few years adopted very full lists of standard stars. Also great improvements might be suggested for other parts of the work.

Ever since the year 1834, when the English 'Nautical almanac' became an astronomical ephemeris as well, the management of this publication has been characterized by a conservatism, which, in these times of change just for change, is delightful to behold. But even conservatism may be unwise; and, if the British 'Nautical almanac,' as an astronomical ephemeris, is to hold in the future the place it has held in the past, a committee of reconstruction, somewhat like that 'relative to the improvement of the Nautical almanac' in 1830, would seem to be required to effect the needed modifications.

David P. Todd.

CONTAGIOUS DISEASES OF DOMESTIC ANIMALS.

The agricultural department at Washington has just issued a volume of some three hundred and fifty pages devoted to the above subject, as the result of the investigations of its veterinary division, — an office distinct from the more newly established 'bureau of animal industries.' The subject-matter, being made up of the reports of the veterinarian-in-chief and his assistants, is of a sort that will, in a way, be interesting and instructive reading for veterinarians, and to a certain extent for comparative pathologists.

The volume opens with a description of a 'veterinary experimental station' recently located, in connection with the department, near Washington, which seems to afford abundant facility for the proposed work, and from which, in the future, much that will tend greatly to aid in protecting our animal interests from the ravages of disease will undoubtedly result. Then follows a detailed report of outbreaks of contagious pleuro-pneumonia among cattle in Connecticut, New Jersey, Pennsylvania, and Maryland. These have an historical interest, but nothing more, because these states have repeatedly been shown to contain this exotic disease; and it has just as repeatedly been shown that a more or less constant interchange of it goes on with the natural traffic of cattle within their borders.

An exceedingly interesting and carefully written report is made by Dr. Salmon upon an enzoötic outbreak of ergotism among cattle in Coffey county, Kan. It is very much to be regretted, for the sake of the department, the cattle interests of Kansas, and the veterinary profession, that, under the circumstances, Dr. Salmon did not himself attend to the matter when first it was reported to be an outbreak of 'foot and mouth disease,' instead of trusting so important a decision to such an unsafe man as 'V. S.' Trumbower proved to be, who, by his own report of the matter given in this same volume, seems to have arrived upon the ground on the afternoon of March 8, to have examined the cattle and their surroundings carefully, and to have then entertained the opinion that the trouble was due to 'foot and mouth disease,' until the 20th of the same month, when he was joined by Dr. Salmon. He then suddenly became as firmly convinced that the trouble was due to ergotism. Is

the department employing unqualified men in this work?

An examination was made to ascertain whether the hay used in Kansas, Missouri, and Illinois, contained ergot, and it was found that several grasses were badly infected with it; and a plate is given showing infected spikes of wild rye, timothy, red-top, and blue grass. It is stated that the proportion of ergot in some spikes of wild rye was ten or twelve per cent of the weight. A chapter is devoted to the nature, chemical composition, and action of ergot. In this chapter is an account of the ergot fungus (Claviceps purpurea), taken from botanical sources, and a plate is given showing the microscopical characters of the fungus. By some oversight, this plate, which is copied from Tulasne, is said to have been drawn from nature by Marx.

The ten pages devoted to 'investigations of swine-plague' are largely made up of a review of the work of Klein and Pasteur upon the same subject, with an insistence upon Dr. Salmon's claim to priority in the discovery of the organism said to be the cause of the disease. A few additional experiments are given tending to show that the specific cause lies in the action of a micrococcus arranged in pairs; and the statement is made that 'a large number of similar observations have been made,' but they are not detailed.

The main objection to be made to the experiments is to the use of *fluid*-culture media, which may be depended upon to give results, to be sure, but not always such as are satisfactory. Solid nutritive materials are by far the easiest in which to detect impurities; and by their use the study of the life-history of any particular bacterium may be carried out with much greater precision. We are aware that Dr. Salmon objects to the use of solid media, but, so far as we have seen, he has not stated the grounds of his objections.

It is impossible to criticise fairly a summary of results without complete knowledge of the experiments by which they were reached. It is stated that "the first annual report of the Bureau of animal industry, which will contain a detailed statement of the investigations made, . . . will be submitted . . . at the close of the year." We await its publication with interest, in the hope of obtaining that detailed statement free from criticism upon others. A direct and simple statement of work done and observations actually made is the method of real progress in the study of the bacteria. One's critics may be trusted to discover the merits or faults that may exist in comparison with the works of others.

A good translation by Mr. Theobald Smith, of Megnin's recent article on the gape-disease in fowls, and its accompanying parasite, which follows, will be of very general interest, and can be read with great profit by those interested in the general subject in all portions of the country.

A long report of the doings of an international veterinary congress, held at Brussels during September, 1883, by Prof. J. Law, seems rather out of place in the volume, because, of all the subjects considered, only one, 'The organization of a veterinary service,' could properly be brought to the notice of the commissioner of agriculture. It is interesting and instructive as showing how far ahead of us the nations of Europe are, in giving attention to the protection of their animals from disease, and what great resources they have in their state veterinary schools, from which to draw *proper* material for their state veterinary service.

Mr. J. H. Saunders's report of his trip to Europe is chiefly valuable and interesting in connection with information which he was able to gather in France regarding the Percheron horse; and his remarks should be read by those who contemplate making importations of these animals, or of any other breed of French horses. Mr. Saunders went to London, and travelled over the same ground in the veterinary privy-council office that had been gone over by agents of the agricultural department before, and with the same results; viz., our beef animals would be admitted free from the 'slaughtering restrictions' when we could show a clean bill of health, and not before. Also 'foot and mouth disease,' as landed in our cattle there, was contracted on board ship during the voyage, the ship having received the infection from British cattle.

Dr. H. J. Detmers gives a very unsatisfactory report of investigations made by him in Texas, of southern cattle-fever. One of his assertions, not in the least proven, however, is, well — new, to say the least; viz., that the virus of this disease is in the saliva of the southern animal. Such assertions, unless made for good and well-shown reasons, are to be deplored as tending rather to hide, than make clear, the very points for the elucidation of which the whole work was ordered done.

A very able paper upon trichiniasis, by Dr. Salmon, is reprinted from the report of a special commission upon the swine industry of the United States, and added to the volume, which closes with the usual reports from the unprofessional correspondents of the department concerning the general health of all kinds of farm animals throughout the country.

THE COAL QUESTION IN ENGLAND.

THE very serious problem of coal-supply has received a thorough review in a recent number of *Nature*. In 1861 the question was considered by Mr. Hull, who estimated that the available coal in Great Britain represented a total amount of 79,843,000,000 tons, which, consumed at the annual rate of 100,000,000 tons, would last about eight centuries. This estimate was later proved to be too high; and in 1871 a commission, appointed to investigate the question, reported that in England there were about 90,207,000,000 tons of coal developed, and about 56,273,000,000 yet unopened, making a total of 146,480,000,000 tons of available coal. Subsequent investigation proved this to be somewhat exaggerated. In these estimates thin seams less than a foot thick are not included,