CATTLE-POISONING BY WATER DROP-WORT.

WE have received from Mr. C. B. Moffat, of Enniscorthy, a note written at the suggestion of Mr. R. J. Moss, registrar of the Royal Dublin Society, in which the question is asked, "Is *Oenanthe crocata* wholesome food?" The question is put owing to the fact that about a month ago Mr. Moffat had occasion to observe a herd of cows browsing on this plant, and had been able to satisfy himself that no injurious effects resulted. As he justly remarks, the records of death from eating this plant leave no doubt as to its usually poisonous character. He cites a case, investigated by Mr. Moss in 1917, in which roots of this plant were found among the stomachic contents of four cows found dead on land that had been flooded. He is, therefore, led to inquire whether the poison is confined to the roots or if at particular seasons or in particular localities the green parts of the water drop-wort are innocuous. Cornevin ("Plantes Vénéneuses") has stated that this plant, on which animals readily browse, leads to cases of poisoning every year; that all parts of the plant are toxic, the root being particularly so; and that drying does not destroy the noxious principle. Holmes (*Pharm. Journ.*, 1902, p. 431) refers to *Oenanthe crocata* as perhaps the most dangerous and virulently poisonous of our native plants. Long ("Plants Poisonous to Live Stock," p. 37) has more recently cited a formidable number of specific English instances confirming the judgment of Cornevin and Holmes. Nevertheless, notwithstanding the silence of these distinguished authorities on the point, the question raised by Mr. Moffat is not new. So long ago as 1845 an authority so eminent as the late Sir Robert Christison ("Poisons," p. 860) explained that while this plant has usually been held to be one of the most virulent of European vegetables, and seems well entitled to this character in general, yet climate or some other more obscure cause renders it inert in some situations. As Christison pointed out, the plant has been the subject of an uninterrupted series of observations since 1570, when Lobel directed attention to its poisonous properties. These observations show that in France, Germany, Holland, Spain, and various parts of England so far north as Liverpool it is actively poisonous at all seasons of the year. Yet the careful experiments undertaken by Christison, while proving the virulence of the plant as grown near Woolwich and near Liverpool, showed that the same species as grown near Edinburgh is devoid of toxic properties. It is singular that little more is known now than Christison knew, and it is to be hoped that those competent to deal with the matter may be induced to undertake the research which is required to settle the questions raised by Mr. Moffat's confirmation from County Wexford of Sir Robert Christison's experience of three-quarters of a century ago as regards Midlothian.

AERONAUTICAL INVENTIONS.

THE Air Ministry wishes it to be known that the Air Inventions Committee, which was formed about nine months ago, has now received and examined upwards of 5000 inventions and suggestions relating to the Air Service. It is regretted that, owing to war conditions, a detailed account of the investigations cannot be published, but the experience of the Committee indicates that it may be possible to publish certain information which will facilitate the work both of the inventors and of the Committee.

The following statement has been drawn up with this object in view, but it is realised that it is incomplete for the reason just given. It is appreciated also that inventors are placed at great disadvantages in present circumstances, for, unless immediately connected either with the Air Services or with aircraft manufacture, it is almost impossible that they should be acquainted with the most recent developments; so rapid has been the rate of progress that it is difficult, even for those in close contact with the Royal Air Force, to keep abreast of all the latest improvements. Again, it is practically useless for inventors at the present time to submit inventions which would necessarily take a long time to develop, the requirements of war and the conditions of labour and material making it impossible for the Committee to support proposals of this nature.

Generally speaking, and so far as the period of the war is concerned, no very startling change in the present type of aircraft is anticipated, although improvements in parts and also in details are always possible, and may produce very important results.

The stage of development in construction which has now been reached is such that major improvements can be expected only from those possessing the requisite scientific and mechanical knowledge, skill, and experience. Thus radical changes in the shape of the wings of aeroplanes, the body, and the propellers are possible only after long and patient research carried out in aeronautical laboratories.

Again, many inventors have forwarded proposals for helicopters and aircraft of this nature, which, if an efficient design can be produced, would possess certain advantages (but probably not so great as was once imagined); others have suggested flapping wings and rotatory planes. Such schemes do not give any promise of being developed for use during this war, and in any case would require some years of experiment before they could be regarded as practical proposals.

As regards minor improvements, inventors should bear in mind that many details, such as turnbuckles, clips, etc., are now standardised, and a change would be justified only by some very marked superiority.

Safety devices for preventing crashing of the machine and the pilot form a numerous class. The chief of these is the parachute, either applied by a harness to the pilot or directly attached to the machine. Those who have seen a passenger dropped by a parachute from an aeroplane for exhibition purposes often fail to realise the conditions under which a parachute may have to be used as a safety appliance. Then the machine may be out of control, dropping at a velocity of 150 to 200 miles per hour, or spinning downwards in flames. Many other safety devices, such as automatic stabilisers, wind-brakes, etc., have been proposed at various times. The additional weight entailed by the use of any of the suggested safety appliances must remain a very serious factor for so long as war conditions prevail.

The engine is the heart of the aeroplane, and on its trustworthiness depends the safety of the pilot. Persons acquainted only with motor-car engine practice sometimes do not realise the exacting conditions under which an aeroplane engine must work. The engine must be capable of running for the whole of the time of flight at its maximum power. The lubrication and ignition must be perfect, and the engine must not become overheated. The rating applied to aeroplane engines is the weight per horse-power, and engines are now being produced which show surprising results in this respect. Inventions which differ radically from present-day practice (such as the internal-combustion turbine) have small possibilities of being adopted, for successive design and reconstruction, entailing probably several years' work, are necessary before satisfactory results can be hoped for.

In view of the shortages of materials and labour at the present time, no new type can be embarked on unless it is demonstrably superior to existing types and possessed of definite and immediate advantages over them.

A subject which is intimately connected with the power plant is its noise. This constitutes one of the disadvantages of an aeroplane. For night-flying a method by which it would be possible to hear from one aeroplane the approach of another would be of great advantage. The engine can be silenced without serious disadvantages, but the noise of the propeller and the hum of the wires are so great that silencing the engine is not sufficient.

Many proposals for the projection of bombs and grenades of flame and of poisonous gases have been received. The trailing bomb or grapnel for attacking enemy aircraft and submarines is a favourite suggestion from inventors. This device was tested before the war and at various times since, but has been abandoned in favour of more effective methods.

Many hundreds of inventions and suggestions for inclinometers and instruments for straight flying and accurate bomb-dropping have been investigated. Efficient and well-designed instruments for these purposes have been available for some time past, but it is quite possible that improved forms may be produced, though it is scarcely likely that this can be done by anyone who does not possess the necessary scientific and mechanical knowledge required for an investigation of this nature. Some inventors entirely disregard the action of centrifugal force upon pendulum and spirit-level devices.

A large number of gyroscopic instruments have been proposed which show insufficient knowledge of the correct application and limitations of a gyroscope.

Anti-aircraft devices of various kinds are constantly suggested, but now contain very little new matter for consideration, as such proposals have received the careful attention of the authorities for a long time past, and have been the subject of much trial and experiment.

The Committee fully appreciates the genuinely patriotic motives which inspire most of the communications which they have received, and it is with the object of encouraging the submission of useful and well-considered proposals that this statement is issued. Inventors should, however, bear in mind that the somewhat obvious proposals which might have been useful in an earlier stage of the war are now no longer serviceable.

FOOD CONSERVATION BY REDUCTION OF RATIONS.[1]

IT is perhaps remarkable that, with all the current discussion regarding food conservation, so little emphasis has been laid upon the possibility of conserving food by reducing the diet. When one recalls the agitation of enthusiasts for reduced diets during the past thirty years, and recognises the fact that all special pet theories can at this psychological moment obtain a better hearing than at any previous time, it is surprising that the advocates of reduced diet have made so little progress, and, indeed, have apparently ceased their propaganda.

The popular conception that we eat too much is usually quantitatively expressed by the statement that we eat "twice as much as we ought." The nutrition laboratory has for years been endeavouring to discover if there exist any special groups of individuals who live regularly upon a diet that would be commensurately low. For this purpose it was assumed that the minimum or basal metabolism must be taken as the index of food requirement. Differences in muscular activity are so great that no two individuals can be compared save on an absolutely quiescent, resting basis. After the metabolism of two hundred or more individuals had been carefully measured, it was seen that, although we were dealing with people of varying ages and dietetic habits, and of supposedly very low metabolism, no such individuals were easily recognised in our measurements. It would thus appear offhand that if there are no individuals other than pathological which present abnormally low basal metabolism, and if the law of conservation of energy in the human body obtains, as we know it does, then there is no *a priori* reason for expecting that a reduced diet can be permanently adhered to. A reduction in diet will simply mean that body reserves will be drawn upon until death from starvation occurs.

Through the kind offices of Profs. J. H. McCurdy and Elmer Berry, of the International Y.M.C.A. College at Springfield, Massachusetts, both unusually interested in metabolism problems, arrangements were made to select twelve men out of a group of volunteers from the student body. The men entered heartily into the spirit of the whole research, and readily consented to all the strict requirements of the test.

The general plan was to curtail the diet sufficiently to reduce the weight approximately 10 per cent. This could have been done by a complete withdrawal of food for about fourteen or fifteen days. It was recognised that these men were, first, college students with obligations for educational advancement, and, secondly, volunteers for scientific research. A complete fast for fourteen days would, in all probability, have caused most of them considerable discomfort, if not distress. The alternative was to curtail the dietetic intake so that the weight-loss would take place, not in fourteen days, but in four to six weeks. This was done by serving the men approximately one-half to two-thirds of the caloric requirements prior to the dietetic control, making absolutely no change in the kinds of foods eaten. The young men were cautioned not to lessen their mental or physical activities. Obviously if the activity of a group of men were lessened, as, for example, by putting them to bed, to use an extreme illustration, their dietetic requirements would be very much less. Suffice it to say that these men carried out all the requirements of collegiate activity, both physical and intellectual, throughout the entire period. As soon as the reduction in weight had reached 10 per cent. or thereabouts, the calories in the intake were increased to such an extent as to hold the weight at a constant level. The number of calories required to hold this weight constant over a considerable period of time could be taken as a fair representation of the actual caloric requirement for this group of men.

To ensure a suitable base-line, therefore, a second group of twelve men from the large number of volunteers originally presenting themselves was selected to act as a control squad. These men were in every particular studied with the same degree of care as squad No. 1, except that there was no dietetic control.

While body-weight can be taken as an approximate index of the metabolic level, further checks were absolutely necessary to rule out the inevitable differences in muscular activity that would be found with groups of individuals, even when they were subsisting under the same collegiate conditions. The gaseous metabolism was therefore measured practically every morning for each one of the first squad. These measurements were made by collecting the expired air and analysing it. From the amounts of oxygen con-

[1] Abridged from an address on "Physiological Effects of a Prolonged Reduction in Diet on Twenty-four Men," given to the American Philosophical Society on April 20 by Prof. Francis G. Benedict. (From the Nutrition Laboratory of the Carnegie Institution of Washington, Boston, Massachusetts.)