

I can imagine a legislator winning a round of applause from the *inane vulgus* by driving a hard bargain with the wretched trader, who, in the face of starvation, might accept any regulations, however hampering, in exchange for the means to live. I can imagine the imposition of tests of airworthiness, strength tests, the enforcement of hobbies such as multiple engines, silencers, special alighting gears, the carrying of parachutes, fire extinguishers, wireless equipment for calling for aid, and countless other things, which may, no doubt, come in their own time, but which would clog the versatility of the engineer, and for years condemn to unproductiveness the nascent industry of air travel. The payment of an army of inspectors would be put down as encouragement money, and would be a charge against the aeronautical vote. A landowner would ask for the power to capture the flyer who has most reluctantly alighted on his ground. He might ask for a law allowing him to impound the aeroplane, on the chance of his registered number being inauthentic, and so secure payment of the damages which he wishes to claim.

Let us rest assured that the amount of civil aircraft will for some years be so much less than the amount of military aircraft now existing, that the total of damage to property and inconvenience to the public, which we at present know to be small, will be much further reduced in proportion to the lesser numbers, the future technical advances, and the less strenuous conditions of manœuvring imposed on peace aeroplanes.

*Labour.*—Among the expectations based on aerial transport and travel, are those of employment for individuals throughout the whole social scale as well as officers and men from the Army and Navy. Our producers, and therefore their employment of labour, depend on the bodies which employ aircraft, viz.: (a) Primarily the Air Force; (b) foreign buyers, nations and colonies; and (c) companies instituted for transport and travel, including postal duties. All these bodies need labour, and all are interested in continuing harmonious relations between those who direct the work and those who manually carry it out.

It has been suggested that since the aircraft industry is a new industry, an exceptional opportunity exists of introducing a totally new atmosphere of harmony unembittered by the old trade quarrels. This is most desirable, but the novelty of the technics of aircraft has not *in fact* eliminated the old trades at all; on the contrary, it has developed the demand for these "tradesmen." The aircraft industry is not a new trade in the sense in which that word is used by the world of labour in the phrase "Trades Union." The aircraft industry includes members of almost all the engineering trades, as well as important additional trades, such as woodworkers, carpenters, organ builders, cabinet makers, fabric workers, &c., and it is necessary for that harmonious relationship to be established between employer and employee, in spite of the fact that the history of all the old trade differences will unavoidably be also the history of the persons and corporate bodies imported into the new industry, with this addition, that a trade quarrel on the subject of organ pipes or on the piece-work price of chairs, may mean a stoppage of aeroplane work, owing to the newly imported craftsmen holding on to the old unions.

Again, it would be unintelligent to pretend that aircraft making can be developed under a compact between employees and managers which shall guarantee continuity of employment for all the manual workers in exchange for a continuity of labour supply to the other. The difficulty is a fundamental one, and perhaps is a worse difficulty in the aircraft industry than in most others. It is this. The technical developments of the art, the unforeseeable shortages of material, and the unavoidable changes of methods and materials, tend, let us say, at one time to the employment in an aircraft factory of 50 per cent. of wood workers and 30 per cent. of steel workers, and there is no human authority who can with sanity pretend to say that in some brief time these proportions will, or will not, be widely changed. If steel or aluminium were to form a greater part of the structure than they do now, because of safety, or diminished fire risk, or what not, any agreement with the wood workers' union for continuity of their employment would install them as a paid but non-working body of pensioners on the industry. Alternatively, British aircraft, hampered by such an agreement, would remain locked in its old technical groove and be debarred from adopting the devices and inventions which throughout the rest of the world would be improving the machine. Surely a hopeless prospect for a technical service required for war!

It is clear, then, that the agreements between manual

and brain workers on aircraft must be part of the general agreement on which our new millennium is to be based.

*Accidents.*—It is unfortunate that the chief contact which the public of England makes with aeronautics is in relation to accidents and casualties. The achievements appear, it is true, but it is almost impossible to visualise them save perhaps in the case of an occasional flight of unusual distance, such as the recent 3,000-mile flight from London to Constantinople, or between London and Turin, and these things appear to be disconnected items giving no impression of the hundreds and thousands of miles of continual flying which is taking place. These show flights are few, not because they cannot be frequently achieved, but because war does not provide for show and *réclame*. The public cannot by a mere lecture be brought to the point of view which is standard with those who have been really familiar with aircraft; we are so imbued with its utility and versatility, that we are no more discountenanced by occasional breakages than we are deflected from hiring a taxi by seeing a sideslip against the kerb. Those actually engaged in design, who naturally need to use every element of experience which accidents may bring to enable them to perfect their work, are anxious to study and analyse these occurrences.

Air accidents can be divided into groups for the purpose of their study, and when we proceed so to divide them we find that by far the largest category includes those which are due to the two following circumstances: (1) The absence of landing-grounds distributed in easy stages to which a flyer can turn for refuge, if his engine should stop; (2) the inexperience of flyers themselves, since the majority of the experienced have been drawn off to the war. If we remove from the records of accidents, other than tuitional, all those which could have been avoided were these causes non-existent, the residue would be less significant *in fact*, and vastly less significant than is the *impression* abroad. Beyond this it is still reasonable and advantageous to sub-divide the causes of this residue of accidents into classes, so that attention should be drawn to that which may be eliminated, be it in design or in handling.

Of the remainder, the most important is what is commonly called "Pilot's error." This does not imply that he is blameworthy. In war, manœuvres which are definitely hazardous are necessary; people may be surprised to hear that to loop the loop is a useful war manœuvre which may greatly puzzle an antagonist in the air, since the looped path takes the place of the expected forward movement, and therefore falsifies the aim of the adversary, or throws out all his estimate of the direction in which to fly for purposes of intercepting him. Another manœuvre, known as "spiralling," or "spinning," if contrived to give the impression that the aeroplane has in fact been thrown out of control, is one of many ruses for breaking off a fight. The learning of these manœuvres must be achieved before they can be used in war, and tends to swell the number of broken machines. Rapid diving, such as might be made in an attack on observation balloons, may similarly be a cause of accident until judgment is acquired in the method of "flattening" out of the dive. Even to describe a *very* small circle in a horizontal plane implies unusual stress on an aeroplane, if accomplished at high speed. None of these manœuvres are called for in trader work, while, to add to the comparative safety of the peace aircraft, we can appreciate the effect of removing the war demand for high performance and speed. Under fire and pursuit safety comes from lightness and manœuvrability, as much as and more than it does from strength and solidity: in trader work the conditions are largely changed if not reversed.

Aircraft travel and transport therefore will, if landing-grounds are provided, not be exposed to any of the risks above named, and accordingly from the list of accidents which occur to-day we must eliminate almost all these in any prognostication as to the future safety of flying.

Much need not be made of the fire dangers on aircraft, for when the matter is regarded dispassionately, the fire risk by actual experience is small. Of the fires which have occurred since thousands of aeroplanes have been turned out per month, the large majority have arisen when the aeroplane has struck the ground and the petrol vapour from the broken-up tanks has come into contact with a spark. Now this breaking-up of a machine on the occasion of a forced landing again becomes a rare occurrence if the line of landing-grounds suggested for aerial routes is provided. Most of these smashes, some fraction of which have resulted in fires, have occurred by reason of the flyer holding up his machine unduly long in his search for a suitable place to alight in a country where no provision for alighting exists.

Of the mechanical precautions taken to avoid fire, we know