# AIRCRAFT INSURANCE.

BY

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I would ordinarily approach the discussion of any subject before an actuarial society with considerable diffidence because I am not an actuary. Fortunately, however, the subject assigned to me requires for its discussion rather more words than figures, and on that basis perhaps I can get along with it.

The consideration of aircraft insurance in casualty lines, to which these remarks are limited, naturally begins with an inquiry respecting the field for such insurance. At the present moment the field appears to be very limited, perhaps too limited to permit an actual application of the fundamental principles of insurance. At this moment it may be broadly stated that the aircraft insurance fields is limited to the heavier-than-air machines, of which class of machines a relatively small number is now available for private or commercial use, and of that small number only a portion is employed for what I may call legitimate purposes to distinguish their use from exhibition and sport purposes. The lighter-than-air machines have not yet been developed to a point where they are used to any extent for private or commercial purposes, and up to the present time have not been considered as within the field of aircraft insurance. The reasons for this condition are many, but prominent among them are the difficulty and expense of equipping and maintaining a lighter-than-air machine. Serious accidents in various parts of the world have demonstrated not only the unreliability but the grave danger attendant upon the use of lighter-than-air machines with inflammable gas as the means for overcoming the force of gravity. Until rather recently no gas suitable for this purpose has been discovered which was not both explosive and dangerous. Helium gas was rather accidentally developed during the war and applied to a limited extent to the lighter-than-air machines. The application was limited because of the difficulty in obtaining the gas, as well as its great expense. The cost of prop-

erly supplying a reasonable-sized dirigible with helium gas runs far into the thousands of dollars and, of course, there is a constant loss of gas, so that the up-keep of such a machine for gas alone is almost, if not quite, prohibitive for private or commercial purposes. So far as I know, no dirigible or other form of balloon has ever been offered for casualty insurance in this country, and under present conditions it is to be hoped that they will not be offered because, for reasons which I will attempt to explain later, it might become necessary to undertake the risk, and it would surely be a risk attendant with most unusual danger, not only to the occupants of the machine itself, but to innocent and unsuspecting people on the ground and in the buildings over which it might move. There is some promise held out that these lighter-than-air machines will sooner or later be developed to the point of practicability for private and commercial use. I certainly hope they will be, for, if they can be rescued from their present unusual hazards, a great field of usefulness can be found for them and they have in many respects an advantage over the other class of aircraft.

For the purposes of this paper I shall limit my comment to the heavier-than-air machines, to which I believe the casualty insurance experience in this country has so far been limited.

Speaking broadly, the field for aircraft insurance is yet to be developed. In fact, the aircraft themselves are yet to be manufactured and sold. Soon after the close of the war a limited number of aircraft were made available to private purchasers. I think the first movement in this direction was when the Canadian government sold its entire stock of aircraft used for training purposes. These machines were of a somewhat similar type and are generally known as the Canadian-Curtiss machines. They are, in fact, about the same type of machines as were used in the United States for training purposes during the war. They are a two-place machine with dual controls designed for carrying an instructor with his pupil, the pupil gradually assuming control as the process of instruction continued. Several hundred of these machines were made available for private purchase through the Canadian sale, and later limited quantities were sold in the United States. The Canadian offerings were rather rapidly absorbed by private purchasers and rather generally devoted to exhibition work and short passenger flights. Young aviators with more or less experience

during the war bought up these machines and established themselves in various communities or traveled about the country making money out of them as best they could. Few of them succeeded in making their enterprises profitable. A very few of these machines were used in a limited way for purely private purposes and commercial work. Their carrying capacity was rather small and, therefore, their use for the transportation of merchandise was necessarily very limited, while their use for advertising purposes was considerably greater. The various types of machines developed during the war are not as a rule available for private or commercial use, although in some notable instances changes have been made in some of the larger machines in an effort to adapt them to commercial use, which effort, however, has met with very little success. Such war machines as were developed, through changes, for carrying loads have largely been employed by the United States government for mail delivery, and a few have reached private purchasers.

After the armistice was signed there was a decided halt in the production of aircraft. A very large number of machines had been manufactured under the impetus of war and the armistice caught the manufacturers and the government with a large number of machines in various stages of construction as well as a large number of machines actually completed. With so many machines in sight and with the known fact that in some instances at least they were offered for sale at prices far below the cost of manufacture, the few concerns in this country which had qualified as successful manufacturers of aircraft found little or no encouragement for the production of machines suitable for the private and commercial use in which the field for insurance lies. In the last few months this situation has changed slightly because manufacturers are now developing new models, advertising them either as accomplished facts or as prospects and in some instances actually selling them. Nevertheless the field at the moment is extremely limited and the available aircraft are very largely used in enterprises of a character not likely to continue, as well as in sports, races, exhibitions, thrilling adventures and hair-breadth escapes. These uses do not furnish an attractive field for insurance; therefore, it may be stated that the field for aircraft insurance at the present time lies largely in the realm of conjecture.

Seventy-five years ago or so a railroad train was as much of a

curiosity as an aircraft is today. In those days small model trains running on circular tracks were exhibited at country fairs, and a small admission fee was charged to see the side show. Railroads, however, possess no opportunities for sport uses. The development of railroads for commercial use was unhindered by any misapplication to pure sport uses. We have never had any railroad races, nor have we had hair-breadth railroad escapes which were staged intentionally, unless we enter the field of moving pictures. The railroad, however, has become an absolute public necessity and important feature in our lives.

Forty years or more later the trolley car was developed. I can well remember that some thirty-five years ago I rode upon the first trolley car I had ever seen, and I believe at this moment it was the first trolley line ever run in this country. That line was on 15th Street in Denver. The motive power was electricity. The wire was placed below the ground and electrical contact was obtained by running a trolley through a slot in the roadway, similar to those used by New York cars today. It was the habit of those days, as I personally observed, to refuse to pay fare on one of these cars until it reached the point at which the passenger expected to alight because as a general rule it did not reach that point. Something was happening all the time, and, judging by the experiences of that particular line, there would never be such a thing as a successful trolley system in the country.

Following this, notably in New York City, came the cable trolleys, and we all know the endless trouble encountered by that particular form of transportation which led to their final abandonment. Notwithstanding these discouragements the trolley system has survived, and while it, like the railroad system, is having its full share of financial difficulties, it has become a necessity in our lives and none of us would care to dispense with it. The trolley, like the railroad, was not adaptable to sport purposes and, therefore, its development was not delayed by misapplication.

Then came the automobile and the history of its development is so recent that comment seems unnecessary. I recall that some twenty years ago I was a member of a small party of automobilists which undertook a "club run" from Hartford to New Britain, a distance of nine miles. The only public garage proprietor in the city at that time offered to send his repair men with a car loaded

with tools and appliances to help out any cripples which might be picked up by the wayside. The repair car broke down during the trip. The other cars reached their destination in safety.

For the first time we found a means of transportation by land which could be devoted to sport purposes, and it was promptly so devoted, and to an extent the development of the automobile was delayed by its misapplication. A speed craze took hold of the people. Automobile racing, exhibitions and tricks became prominent in the early days of that means of transportation, and for a time their prominence promised to over-shadow the really serious personal and commercial use to which an automibile could be put. But the automobile survived. In its early days it was cordially hated by a vast majority of the people, particularly in rural communities, and today it is found in almost countless numbers in all communities. It has come to be a necessity and the people at large probably feel that they cannot dispense with its use.

In the automobile as a means of transportation we find something which more closely approximates the aircraft than in any other present form of transportation, particularly by land. The all important question from the insurance standpoint is, will the history of the railroads, the trolleys and the automobiles be repeated in the future history of the aircraft? To that question no positive answer can be made at present. Like the automobile in its early days, the aircraft of today is very largely devoted to pure sport purposes, and its commercial development has been scarcely undertaken. It was many years after the private and pleasure automobile was well established that attention was seriously given to the development of the commercial side of this means of transportation. The automobile survived its purely personal and sport use. It survived the cordial dislike of a large majority of the population and has developed into a commercial necessity. Will the aircraft do the same thing? We may reason toward an answer by examining some of the claims which can be made on behalf of aircraft as a means of transportation, as well as the obstacles, in comparison with other means of transportation now available.

Prominent among those claims is the matter of speed. The speed which has been obtained in aircraft is already phenomenal, and the possible speed of the future is beyond conjecture, but speed is not the only consideration. If a man under urgent business requirements can actually fly from Chicago to New York in eight

or ten hours when transportation by train would require more than twice that time, that looks attractive on its face, and it looks as though aircraft might be developed as a means for rapid transportation, but we must go to step further and consider the fact that a trip from New York to Chicago in a given number of hours is only a part of the story. The railroad stations in New York and Chicago are accessible, and when a passenger arrives at a railroad station there are convenient means of local transportation by use of which the traveler can reach his actual destination speedily. It is not so with the aircraft at present. If a man in the business center of Chicago desires to travel by aircraft to New York, he must first journey to an outlying field which must necessarily be in the suburbs and not necessarily within convenient reach by means of short local travel. Therefore, he spends a fair portion of the time apparently saved in his trip in getting to a starting place. Then when he arrives at New York, the same situation is encountered. Perhaps he may land at Mineola or somewhere on Long Island, and actually require an hour or more to travel from that place to his actual destination in the down town business district of New York City. In this aspect the allurements of the aircraft lose some of their force because the time actually saved, even if the trip be accomplished without mishap, is much less than it appears to be on the face of the record, all of which goes to show that before the aircraft can be recognized as a suitable and necessary means for rapid transportation, landing facilities must be provided with means for rapid transportation to business centers in the various cities of the country. Up to the present moment no substantial progress has been made in that direction and all of this militates against the development of the aircraft and, consequently, against the development of the field for aircraft insurance.

The dangers of aircraft transportation have in the past deterred —and will in the future deter—a great many people from accepting that means of travel. These dangers are probably very largely exaggerated. The railroads, the trolleys and the automobiles have left behind them in the course of their development a long trail of dead and injured, and the fact that aircraft transportation is dangerous will not probably of itself seriously delay the development of aircraft as a means of transportation if other obstacles are removed.

Drawing my figures from a publication which happens to be

before me at the moment, it is claimed that during the war there were 20,142 men trained for aviation in this country. They were trained upon fields more or less congested and with machines more or less deficient. It is claimed that there were 869,831 flying hours involved in this training, and there were 298 fatalities. If these figures are correct, even under the unusual conditions attendant upon war training and the unusual hazards due to an undeveloped machine, there was only one fatality in nearly 3,000 hours of flight, and 3,000 hours of flight under favorable conditions and at a fairly moderate speed would take an aviator seven or eight times around the world if such a thing were practically possible. There are reasons for believing that fatal accident frequency in private and commercial use would be much lower than the frequency recorded during the period of war training when all surrounding conditions are considered.

I understand upon the figures compiled by the United States Air Service covering a period of six months duriny the war only about 2½ per cent. of all the accidents, both fatal and non-fatal, were due to failure in the plane construction or its parts. The same tabulation shows that in the event of injury where a machine carries a pilot and one or more passengers, the pilot is the most likely to escape.

In the consideration of accident frequency in aeroplanes for the purpose of reaching rate results we have proceeded upon the theory that the proportion of fatal injuries to total number of injuries would be very much larger than it is in the ordinary casualty lines. This theory has been particularly applied to workmen's compensation. Whether it will prove true in practice or not remains to be seen, but it seems rather reasonable to assume in the absence of reliable data that in the distribution of accidents as to results, we shall find cases involving total and permanent disability in far greater proportion than similar results will be noted in other lines.

Another theory has been employed in developing compensation rates particularly, and that is that a larger proportion of aircraft pilots will be found in the event of fatal injuries to be without dependents than is found in the ordinary compensation lines. This is conjecture almost entirely. So far as I know there is no data of any moment which would serve to either prove or disprove this theory, but it has been used almost from necessity in order to produce an aircraft rate, particularly for compensation, which was not

on its face prohibitive and would not serve to obstruct the progress of this new means of transportation.

Perhaps we may conclude that the dangers attendant upon transportation by means of aircraft will not of themselves prevent its development to a point which will furnish a real insurance field. At least that seems to be a reasonable conclusion.

The next feature which apparently weighs against the growth of the aircraft as a means of transportation is its instability and unreliability, both of which for our purposes mean about the same thing. In this respect perhaps it does not differ from the automobile in its earlier history, or even from the railroads or trolleys. Stability and dependability are matters of development, and having faith, as we must, in the inventive genius of our people, we may with reason conclude that these conditions will be materially improved, if not largely removed, by early development. However, the present alleged instability of the aircraft is not abundantly supported by evidence. Our government has been using aircraft in its mail service. It is stated that out of about 1,250 mail delivery trips actually projected, 1,200 were actually made, while the failures were only about 50. This is a most general and inexact statement but will answer present purposes. Of the contemplated mileage for these trips it is claimed that practically 98 per cent. was actually flown.

The item of cost is of course a very important factor in considering the question of development, but in its present aspect it has a very marked similarity to earlier questions respecting the automobile. Aircraft, so far as they are available, can be purchased at almost any price which a person is willing to pay. I believe a dependable one-place machine for purely private use can be had for $2,000 or perhaps less. I am not now considering second-hand machines which can be bought still cheaper. From that minimum point the price may increase almost without limit. It is unnecessary to give much attention to the embellishments of aircraft for purely ornamental or fanciful purposes in considering cost, but it is important to know how far the item of cost will deter the managers of commercial enterprises from undertaking the aircraft as one of their means of doing business, and by this I mean an aircraft of a type which will carry a reasonable quantity of merchandise. A heavier-than-air machine which will carry as much as a ton of merchandise aside from the pilot, crew and

other necessary load would be a large and expensive machine. All of the elements of construction, as well as all of the elements of power, would be very expensive. I do not really know what such a machine would cost at the present time, but I think the cost would exceed $25,000. Here the lighter-than-air machine would have many advantages because construction, outside of the gas supply, would probably be less expensive. Therefore, when the gas supply problem is settled, if it ever is, the field for the lighter-than-air machine is probably found in the transportation of dead weights where actual sustained speed is not so important.

We know very little at present about the cost of maintenance and repair, although we have a general understanding that it is pretty large. An engine used in an aircraft is capable of perhaps 100 hours of service, although it is customarily removed and overhauled after a very much shorter period of service.

We know very little about the cost of fuel. Some rather reckless statements have been made respecting fuel cost as well as the cost of repairs and allowances for depreciation. I regard none of these statements as dependable, but the sum total of the whole situation appears to be that the initial cost as well as the cost of maintenance and use is at the present time nearly, if not quite, prohibitive, and unless this obstacle can be reasonably reduced, the development of the aircraft, for commercial purposes at least, will be slow. However, we are reminded of the apparently unanswerable objections of not more than ten years ago respecting the automobile and how successfully the claims respecting excessive cost, not only as to the original purchase price, but as to maintenance and use, have been dealt with. The economy of transportation by automobile truck has been adequately demonstrated, as is evidenced by the constantly growing use of these vehicles. Will the same thing happen with respect to aircraft capable of carrying heavy loads? I confess at once I do not know the answer, but it is safe for present purposes to say that those who have the development of the aircraft in charge have a far greater problem to deal with in the matter of initial cost and subsequent expense than those who had to do with the development of the automobile, even in its earlier years.

We might go on almost indefinitely considering the probabilities of the future development of the aircraft and the resulting development of a field for insurance, but enough has been said to fairly establish the claim that we have not reached the point of develop-

ment yet, nor do we see in the near future the promise of a development likely to result in the early establishment of a field for casualty insurance presenting a sufficient volume to permit the application of fundamental insurance principles.

Having reached that point, the next question is, why should aircraft insurance be undertaken by casualty companies? Here we encounter an entirely different line of reasoning. We all know that in spite of all delays and hindrances there are a large number of aircraft in operation in various parts of the country. A very large portion of these machines is owned by the government and operated either by the army or navy, or in the mail service. These operations obviously do not come within the field of insurance. After all, however, there are some left. There are such things in use as private and commercial aircraft. Their use in many instances involves the employment of pilots and others who in the course of their duties as employees are required to fly. The compensation laws in most of our states require insurance or security for the compensation obligation. If the owners of aircraft in civil life have employees, the law in a great many instances at least requires them to obtain insurance. There are many reasons for claiming that insurance companies professing to write the compensation lines would fail in their duty if they did not devise means for providing insurance in that line which the law requires. Therefore, perhaps the first reason why aircraft insurance has been undertaken is that it is the duty of insurance companies to provide it, or devise means through which it can be secured. These considerations apply to workmen's compensation insurance only, but a company undertaking this line would naturally conclude that there should go with it such other lines, within its corporate powers, as would serve to increase premium receipts and to an extent improve distribution in a limited field. The only casualty company definitely announcing an aircraft program, so far as I know, has included in that program, with workmen's compensation, public liability and property damage, as well as individual accident insurance for passengers and others exposed to the hazard of flying.

Passing the compensation line for the present, I may say that the public liability and property damage lines are in some respects similar to the same lines now undertaken by many casualty companies upon automobiles. They differ, however, in one essential particular, which is, that the public liability policies do not cover

the passenger hazard. So far as I know, there is no present provision made upon the liability basis for the passenger hazard by any of the American companies. That is taken care of so far as is possible by offering personal accident insurance which can be obtained in the form of daily tickets, trip tickets or annual contracts under the conditions imposed by the company writing them. This provision does not take care of the legal liability of the owner of the aircraft, but if we consider the theory of assumed hazard, which is so clearly chargeable to the passenger, and assume that accident insurance in a definite amount is furnished by or through the owner for the benefit of the passenger with a possible agreement, which would be legal in some instances, that the passenger in the event of injury would accept the provisions of the individual accident policy in lieu of all other claims, we approach, at least, a public liability protection for passengers.

You will observe also that in my enumeration of lines I have omitted collision as ordinarily written upon automobiles. So far as I know, casualty companies have not undertaken this risk, although I believe the fire companies have undertaken if to a limited extent. Every landing of an aircraft, whether forced or intended, is a collision, and all resulting damage to the craft itself would constitute a collision claim. It might be claimed that this could be excluded from a collision policy, but effort in that direction indicates that an attempt to exclude it would exclude so much as to make the collision policy of very little value. If a collision policy is to be written at all, it ought to cover the damage due to landings where the damage is more than casual, and yet for contract purposes it is hard to draw the line.

The public liability and property damage are written together, never separately. The combined basis rate at present all over the country is $125 for each aircraft, of which $50 is assigned to public liability and $75 to property damage. The policy limits for public liability are customarily $5,000/10,000 and policy limit for property damage is $1,000. This basis rate applies to ordinary flying, or what we might call straight-away work. It is the rule of the company writing such business that if the aircraft insured is used for exhibition, trick or stunt flying, demonstration or instruction, the basis rate shall be increased 60 per cent. There exists within my knowledge no actuarial reason either for the basis or its increase. It is a pure matter of conjecture. From such limited experience

as has been obtained during the few months in which this line has been written by one company, the public liability rate appears to be too low, while the property damage rate appears to be sufficient. The relation between these rates seems disproportionate in view of the relation between the limits expressed in the policies, but the theory was that frequent property damage would be produced by forced or intentional landings damaging crops, trees, buildings and animals, while injuries to persons would be less frequent. I believe the experience to date has been exactly the reverse. A number of public personal injury claims have developed and very few property damage claims.

I shall refer to the individual accident feature very briefly because its details do not come under my personal observation. A daily ticket policy is issued which becomes applicable at whatever hour the flight is started during a given day and continues until four o'clock A. M. the following day. This ticket policy is for the principal sum of $5,000, with the usual indemnities for dismemberment and loss of sight, and also for disabilities temporary in character. Weekly indemnities, however, apply only where the holder of the ticket is a man. Similar tickets are issued to women with the weekly indemnities eliminated and the premium cost of the ticket is $5.00 for men and $4.00 for women. This ticket policy plan has been developed so that we may issue a similar contract to cover a trip of whatever duration, including a round trip, if that is desired, and these we call trip ticket policies. The rates depend upon the length and character of the trip and at present are largely matters of negotiation in individual cases. There are also means provided for obtaining an annual personal accident policy carrying a rider permitting flight in aircraft, and the charge for this rider is $50 for each $1,000 of the principal sum.

Matters of life insurance are not within the particular observation of this Society, but I may mention in passing that life insurance with an aircraft permit may also be obtained. It is issued in one-year non-renewable term form only, and the extra premium rate per $1,000 of insurance in addition to the term rate is for a passenger $50 and for a pilot $90.

It may be said generally that all the foregoing rates have been reached without substantial actuarial data except in so far as the obtainable experience used in the computation of the compensation

rate has assisted in the determination of the personal accident and life rates.

We may now consider briefly such experience as we have, which has been largely obtained from the Government and particularly through the War Department, which kindly gave our actuaries personal access to its records. In an effort to adapt the available experience to the necessities of rate computation we were obliged to establish several more or less theoretical hypotheses:

1. In the event of injury to a pilot, whether fatal or not, the compensation would be maximum because of the high wage rate.

2. We had some very dependable data upon aircraft accidents generally in which accidents due to stunting, collisions in the air, collisions on the ground and straight flying were separated and the injuries were classified according to their kind. That is, fatal or non-fatal. Since our first effort was to establish a basis rate for straight flying we excluded accidents due to stunting from the computation.

3. Since the conditions at the training fields presented serious features of congestion with resulting collisions in the air, we assumed that these conditions would not exist in private flying to the same extent and, therefore, adopted the hypothesis that one half of the accidents due to collision should be excluded in our computation.

4. The number of fatalities resulting in compensation payment to dependents was treated upon pure hypothesis. In ordinary compensation lines out of 100,000 industrial accidents 932 would be fatal and of that number 705 would be settled on the basis of full dependency, 32 on the basis of partial dependency and 195 on the basis of no dependents. Considering the age, environments and general characteristics of the aviators developed during the war and assuming that many of these aviators would find their place in private and commercial work in times of peace we took considerable liberty with this distribution by degree of dependency. We produced our rates upon the theory that instead of 705 cases of full dependency there would be but 352, which was intended to be 50 per cent., and the remaining 353 were treated as further cases involving no dependents and, therefore, added to the 195 cases of that character found in the general experience. It occurs to me now that this hypothesis may be somewhat violent, particularly bearing in mind the unusual marriage opportunities which are

presented to many young aviators if current reports are to be believed. At any rate, whether right or wrong, present rate procedure is upon that basis.

5. The elements of exposure also ought to be treated upon theory rather than data. We had the government records, and from all we could gather the annual exposure of an aviator could be reasonably placed at 200 hours actually in the air. For the private use it seemed necessary to at least double this exposure.

6. On the medical aid feature, we assume medical payment in each case.

A tabulation of the experience in the government schools in this country showed that the total number of deaths per 100,000 flying hours, excluding stunting, passengers, passengers during stunting, and one-half of the collision cases, was 23. Upon the same tabulation the total number of non-fatal injuries per 100,000 flying hours with the same exclusion was 14. While we accepted the fatal results as shown by this tabulation with considerable confidence, the non-fatal results were not equally convincing because we felt pretty certain that many injuries of a non-fatal kind never found their way into the reports and, consequently, were not represented in the War Department data. This is but natural, as field commanders striving for records would naturally withhold all reports of injuries considered by them trivial and unnecessary. Perhaps we would not consider the same injuries trivial. We considered it safe and necessary to increase the non-fatal results from 14 to 28, and these elements were used as the basis for the computation, adding of course a medical charge for the sum of the two elements of both fatal and non-fatal injuries. That is, a medical charge in 51 cases for every 100,000 hours of flight. This resulted in the determination of an expected accident frequently per year per aviator upon a basis of 400 flying hours. The fatal frequency was .092. The non-fatal frequency .112, and the medical frequency was again the sum of these two elements, or .204.

I will not undertake to follow this branch of the actuarial computation any further, because, if I do, I will soon be beyond my depth. It will be so much easier for any of you to apply these fundamental data to the requirements of the compensation law in any state that I leave that part of it to you.

There is one other feature in the rate making which ought to be mentioned, and that is the expense loading. We start with

the proposition that the rate per aviator, which is necessarily per capita under this method of premium computation, constitutes a high premium unit, and on the general theory affecting the expense loading that has a bearing upon the elements of that loading. The expense loading finally adopted for use throughout the country was 35 per cent. As premium computation was not on the basis of wages, there was no audit, and as the premium unit was high, some of the elements of expense became lower in proportion for reasons which will be obvious to you. The division of this loading was as follows:

| | |
|---|---|
| Acquisition | 17½% |
| Administration, excluding audit | 4 |
| Inspection | 3 |
| Investigation and adjustment of claims | 5 |
| Taxes, licenses and fees | 4 |
| Profit | 1½ |
| Total | 35% |

This theory of expense loading was accepted in all states having power of approval of rates except New York state, where the standard expense loading was required.

The Workmen's Compensation classifications adopted and approved very generally through the country are as follows:

"Aircraft Operation—commercial or private, excluding demonstration, testing, instruction, public exhibition, trick or stunt flying 7400

"Aircraft Operation—demonstrating, testing, instruction, public exhibition, trick or stunt flying 7401

"*Note.*—The premium named in connection with the two preceding classifications apply to each employee who is permitted or required to be upon aircraft while under their own power, but upon written notice to the Company the employer may substitute one employee for another without additional charge. During the policy period the employer may add other employees or may cancel from the policy employees previously covered, both upon a short rate basis. In no event shall the premium for the entire policy be reduced below the minimum premium herein provided."

The rate for classification No. 7401 is uniformly 160 per cent. of the rate for classification No. 7400. The minimum premium is uniformly the annual premium for one aviator.

Rates have been computed for practically all the compensation states and filed and approved where required in most of them.

The rates for each of the states as computed for each of the classifications are as follows:

| *State* | *7400* | *7401* |
|---|---|---|
| California | $340 | $544 |
| Colorado | 195 | 312 |
| Connecticut | 340 | 544 |
| Delaware | 220 | 352 |
| Idaho | 365 | 584 |
| Illinois | 240 | 384 |
| Indiana | 240 | 384 |
| Iowa | 290 | 464 |
| Kansas | 260 | 416 |
| Kentucky | 250 | 400 |
| Louisiana | 290 | 464 |
| Maine | 240 | 384 |
| Massachusetts | 270 | 432 |
| Maryland | 275 | 440 |
| Michigan | 265 | 424 |
| Minnesota | 285 | 456 |
| Missouri | 280 | 448 |
| Montana | 285 | 456 |
| Nebraska | 315 | 504 |
| New Hampshire | 225 | 360 |
| New Jersey | 225 | 360 |
| New Mexico | 235 | 376 |
| New York | 365 | 584 |
| Oklahoma | 410 | 656 |
| Pennsylvania | 230 | 368 |
| Rhode Island | 215 | 344 |
| South Dakota | 200 | 320 |
| Tennessee | 275 | 440 |
| Texas | 310 | 496 |
| Utah | 375 | 600 |
| Vermont | 220 | 352 |
| Virginia | 195 | 312 |
| Wisconsin | 295 | 472 |

There are probably other reasons why aircraft insurance should be undertaken in this country without awaiting the full development of the field. In this paper an attempt has been made to view the prospects of the near future in a very conservative way which might be adjudged by some as pessimistic. Notwithstanding all the difficulties suggested and many others likely to be encountered, aircraft of all kinds will be used in the future to a greater or less extent, and an early development of sound under-

writing theories and practices, as well as an early purchase (and I use that word advisedly) of a substantial amount of aircraft experience for future guidance may be regarded as almost necessary. It really matters very little if the field in the near future is to be restricted or if the final development of the aircraft stops at a point short of making it a necessity in our personal and commercial lives. The aircraft has come to stay beyond any question, and its future depends very largely upon the preparations made for its acceptance and regulation. I wish to comment on these features briefly.

Suitable landing fields properly constructed and guarded must be established at points reasonably accessible to the business centers of our cities. The proper construction and arrangement of the landing places is a subject worthy of very careful consideration. The aircraft still remains more or less of a curiosity to the public at large. The landing of an aircraft attracts a crowd and very few people in that crowd realize the dangers involved when the aviator undertakes to resume his flight by setting his machinery in motion. On landing fields the public must be properly segregated and protected by reasonable enclosures, and the field itself must be kept clear. Regulations respecting landing where that is attempted by more than one machine must be carefully worked out. An aircraft occupies a good deal of space on the ground, even if it is a comparatively small machine, and the element of space occupation will sometimes form the basis of differential, particularly in public liability and property damage rate-making. The establishment of these fields, while largely dependent upon private enterprise, must be reasonably controlled by well-considered legislative enactment.

In matters of flight there are several things to be considered. An aviator who flies over my house is guilty of trespass. The old common-law maxim. "He who owns the ground owns also to the stars" makes a land owner the proprietor of the air above his land, and in that air a passing aviator is a trespasser. When fights are taken over populous centers, dangers of unnecessary magnitude are created. They involve unsuspecting people on the streets and in the buildings, any one of whom may be injured by some mishap, or the dropping of some article in, or some part of, the machine. In the continental countries and in England there are known such things as "air lanes." That is, routes of travel are laid out to a

certain extent at least, and while I am not familiar with the requirements I have an idea that regard is had in the establishment of these routes for the proper protection of dense centers of population where the hazard of injury increases with density. There is really no reason why an aircraft in flight except for exhibition or advertising purposes should pass over the center of a city. It can easily pass around it and as landing places are necessarily in suburbs and less populous centers, this exposure could be materially reduced by wise legislation.

There are many other points along these lines which might be mentioned, but I will include only one which to my mind is of the utmost importance.

Given the best aircraft in the world, the safety of its flight depends very largely upon the personal skill and fitness of the pilot in charge. The element of personal fitness enters very largely into the consideration of the aircraft risk from an insurance standpoint, and before a reasonable field for insurance can be developed upon a suitable basis there must be legal control of this situation which is very exact and very effective in its nature. Whether this control is to be undertaken by the Federal Government or by states is a question now under discussion and upon which opinions differ, but in either event there should be a control and it should be real and not theoretical. At present there is no control whatever. The Federal Government has some sort of a licensing system and one or more private organizations pretend to issue licenses certifying to the qualifications of an aviator. Neither of these arrangements is of any avail because it is not based upon the necessary requirements, nor is the aviator sufficiently under observation to make those licenses effective. The thing required above all other things is to provide by law that no person shall operate an aircraft either for himself or for others until he is duly licensed for that purpose, and the process of licensing should involve most rigid physical, mental and moral examination to determine the absolute fitness of the individual who is to be entrusted with a task which immediately becomes tremendously perilous, if he is not fit. A single examination, however careful, with a resulting license is not sufficient, however. The evidence seems to be that a pilot who is fit for that work today may be unfit six months or less in the future. There are conditions found in constant flying calculated to produce physical or mental changes which render a man who was once fit quite

unfit to continue his work. As a result licenses should be issued for a short term, certainly not more than one year, and preferably for a lesser term, and the holder of such a license should present himself at the end of each term for reexamination, which should be equally exact and careful and upon which his ability to continue as a licensed aviator should depend. Viewing the whole situation, I regard the personal qualifications of the aviator as of the utmost importance.

We may assume freely that aircraft will be improved, that they will be rendered more stable, more dependable, and less difficult of operation. Perhaps they will be much less expensive in original cost and subsequent up-keep in the near future, but all this will be of little avail unless the personal fitness of the pilot, whether he be an employee or an owner, is made the subject of constant, careful, rigid supervision under the operation of well considered and fully enforced laws enacted either by the Congress of the United States or by legislatures of the several states.

Any extended discussion of possible differentials in aircraft rate making would require me to assume powers of prophecy which I do not possess. It is fairly safe, however, to predict that none of the special requirements respecting landing facilities, lanes of flight, or the personality of the aviator will ever enter into rate differential practice. On the other hand it seems rather probable that as time passes and our knowledge increases we shall find many occasions for introducing differential features in rate making depending upon construction, arrangement and equipment of the individual aircraft which is the basis for the rate. This statement from its nature excludes differential possibilities as respects workmen's compensation. We already have one differential based upon the use of the aircraft which applies to public liability, property damage and compensation as well. It is not impossible that differentials because of use will be further elaborated as the various uses to which aircraft may be put are developed. At present, however, it seems rather likely that differential efforts will be directed toward those rates which are based upon the aircraft itself. By this I mean the public liability and property damage rates in our case, and the same considerations would apply to the fire hazard and the collision hazard in so far as those are undertaken. The superiority of one form of construction over another or one method of equipment over another is a matter still in the field of discussion. There are

many varieties of wings and bodies. There are many differing arrangements for engines, not only as to number but as to location and power. Methods of control differ somewhat, particularly as between the light and the heavy machines. General methods of operation, including sparking devices, gasoline feed and things of that character are still matters of controversy, but out of them will probably grow at least a limited and perhaps an extended system of differentials which in due time must have actuarial attention. I think the discussion of this feature in the aircraft insurance rates of the future cannot be profitably extended at this time.

Our former allies, as well as our former enemies on the other side of the water, are far ahead of us in the development of the aircraft, and in the development of the necessary insurance plans to go with it. It is freely stated that England is to be the aircraft center of the world, and that from England will come the insurance plans and provisions in the various lines required and without which aircraft projects of whatever nature cannot succeed. I think at least the United States ought to strive to divide this honor with our former ally. I think we ought to make it our business as representatives of American Insurance to see that the United States remains on the map in the matter of aircraft insurance, as well as aircraft development. The heavier-than-air machine was born in the United States, developed to a certain point but ignored as a factor of any value by the people at large. Other countries took up the project which we neglected, and we have suffered much in consequence. If reconstruction is ever accomplished, if we ever come back to normal times and to a normal method of living, there will come a period of sharp competition during which recourse must be had to every possible method for maintaining our position in our own markets and in the markets of the world. In this the aircraft will most surely play its part and a very important part too. The fact that we here in the United States are far behind England and all other countries in the development of this most helpful competitive means should not deter us as representatives of insurance interests from laying a sound foundation and establishing a useful practice for aircraft insurance notwithstanding present discouragements, notwithstanding a limited field and notwithstanding the lack of substantial hope for the immediate future.

These thoughts I commend to you for your earnest attention because through you many of the plans for the insurance of air-

craft must be developed and your neglect or failure to give them your very best attention in these very early days and in the face of every discouragement will militate very largely against the insurance interests of our country as well as against the commercial interests with which our insurance is so intimately associated. We must have the aircraft. It must be developed and improved. It must be cheapened in cost and up-keep. It must be dependable. It must be practical. It must do its part in the annihilation of space, a part now so amply played in the transmission of words by telegraph either of the old kind or of the more modern sort. Chicago can order goods from New York by telegraph in a few minutes, but New York cannot deliver goods to Chicago with sufficient promptness to meet the requirements of the future by the means now at hand. The railroads are largely impotent. The steamships are not always available. The automobile truck has its limitations and certainly the aircraft has its place. We must not forget these things. We must work in anticipation of the future. We must work for the supremacy of the United States of America in all things respecting her commerce and those plans for commerce which experience has demonstrated as feasible and which probably will soon be regarded as necessary.