

CASUALTY INSURANCE FOR AUTOMOBILE OWNERS.

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The title of this paper requires an explanation. Automobile insurance embraces such a wide range of coverage that it is necessary to limit the scope of the subject matter to be discussed. Every conceivable misfortune that can happen to the owner of an automobile or to the automobile itself (except deterioration and wear and tear of the automobile) has been made the basis for insurance. The principal forms of coverage are fire, transportation, theft, public liability, property damage and collision. Fire, marine and casualty insurance companies are interested in different phases of the insurance. In some states a single carrier may issue so-called complete protection, embracing all forms of coverage. However, these cases are exceptional and as a general rule the field is parcelled out to the three branches of the insurance business. Where this condition obtains complete coverage can be offered only under combination policies issued by fire or marine and casualty insurance companies acting coöperatively.

There is some slight overlapping of jurisdiction. Fire and marine insurance companies in general enjoy a monopoly with reference to forms of protection against loss by theft, fire, lightning, explosion and the hazards of land and marine transportation. Casualty insurance companies exercise exclusive control over public liability coverage. All three classes of carriers offer protection against loss occasioned by property damage and collision. As regards these forms of coverage the casualty companies write the larger volume of property damage insurance and the fire and marine companies the larger volume of collision insurance.

It is the purpose of this paper to discuss automobile insurance from the point of view of casualty insurance companies. The forms of coverage to be described, therefore, are public liability, property damage and collision.

There are two reasons for thus limiting the scope of the paper. In the first place, this Society is primarily interested in the problems peculiar to casualty insurance. In the second place, the entire

field of automobile insurance is so extensive that it cannot be adequately described in limited space.

The subject will be treated with the idea of providing a simple explanation of this form of casualty insurance which will assist prospective students in preparing for our examinations. It is hoped also that it may broaden the viewpoint of those members of the Society whose business interests touch casualty insurance only in a limited way.

It should be borne in mind that automobile insurance is becoming one of the most important lines from the standpoint of the casualty company. It has grown rapidly and to-day it represents a premium volume of respectable size; in 1917, forty-five casualty companies wrote an aggregate volume of premiums exceeding \$45,000,000. There will be a material increase in these figures, for it cannot be said that the field has been thoroughly developed. The ratio of insured automobiles to the total number of automobiles owned in the United States is still very low; it has been estimated that not over one car in ten is covered by casualty insurance. The future will show an increase in this ratio as automobile insurance becomes more thoroughly standardized and thus more attractive to the automobile owner. Furthermore, the number of automobiles in use is steadily increasing. In 1917 there were approximately 425,000 automobile trucks in the United States and approximately one in twenty families owned a private pleasure car. As the automobile becomes more thoroughly established in the life of the country, the field for insurance will expand. There is every reason to believe that in time automobile insurance will overtake and exceed workmen's compensation insurance as a source of premium income.

COVERAGE.*

Public Liability.

Automobile public liability insurance provides coverage against loss arising out of the legal responsibility for personal injuries

* No attempt has been made to go into refinements in describing the various forms of coverage—general principles only have been treated. Thus, no mention is made of the incidental employers' liability insurance which may be written in conjunction with public liability coverage, the so-called "defect coverage" which protects manufacturers against responsibility for public liability and property damage suits attributable to imperfections in automobiles manufactured by them, the property damage insurance for garage owners which offers coverage against claims for property damaged while in their care, etc.

accidentally caused or alleged to have caused by reason of the ownership, use or maintenance of automobiles.*

The protection is limited to claims presented by the public, injuries to the owner himself not being covered. To secure such coverage personal accident insurance must be purchased. Nor are the employes of the assured covered. If such coverage is desired a workman's compensation or employers' liability policy must be obtained depending upon whether or not the employers' liability is defined by a workmen's compensation statute.

There are certain standard limitations upon the scope of this coverage. Naturally it does not extend to accidents which occur outside the period named in the policy. Nor is an accident covered unless it occurs within the limits of the United States of America and Canada. This latter rule is subject to exception in the case of automobiles of the private pleasure type provided an additional premium is paid for such extra-territorial coverage. Furthermore, the insurance is not effective while an automobile is being operated in any race or speed contest or while it is driven by any person in violation of law as to age, or in any event by a person under the age of sixteen years.

With these exceptions, the insurance carrier engages to place itself in the position of the assured—to investigate the accidents in which the assured's automobile is involved; to receive claims for damages; to make such settlement of these claims as it may deem desirable; in case of litigation to represent the assured in court; to defend him in such legal proceedings and to pay the cost thereof as well as the judgment if the case is decided in favor of the claimant. However, in the payment of claims the carrier is not obligated to exceed the limits of liability expressed in the policy. Nor does it assume any responsibility to provide defense to the assured or his chauffeur or other employe on account of arrest.

A policy is usually written with two limits upon the liability of the carrier. The smaller limit is the maximum amount which the carrier is obligated to pay on account of injury to a single individual in any one accident. The higher limit is the maximum

* Originally these policies were purely contracts of indemnity and were so interpreted; the carrier escaped liability if the assured became insolvent and thus financially unable to pay a judgment. To-day, however, it is the general rule that the carrier assumes responsibility up to the limits stated in the policy irrespective of the financial status of the assured.

amount for which the carrier is responsible on account of all the claims arising out of a single accident in which more than one person is injured. Thus, in the case of the standard limits of \$5,000 and \$10,000, the carrier assumes liability up to the limit of \$5,000 on account of the claim presented by a single individual and subject to this limit per individual, it is responsible for a total liability not to exceed \$10,000 on account of all the claims arising out of a single accident. If insurance with these limits is purchased by an assured and a judgment of \$15,000 is awarded a person injured by the assured's automobile, the insurance carrier is responsible for \$5,000 of this amount and the assured is personally responsible for the remainder. However, if three persons are injured in a single accident and the judgments awarded are respectively \$1,000, \$3,000 and \$6,000, the insurance carrier is responsible for the entire amount of the first two claims and \$5,000 of the third claim. In this case the assured must personally take care of the excess \$1,000. If the second person should receive an award of \$5,000 the insurance carrier would be responsible for a total of \$10,000 on account of the three claims. The assured would thus be called upon personally to account for \$2,000. The question of limits is a most important one, particularly in view of the tendency which has become apparent in late years, for juries to make excessive awards in individual cases. In these days verdicts exceeding \$25,000 are no longer rare. The limits of liability included in the coverage for which so-called manual rates are charged are the standard limits of \$5,000 and \$10,000 (commonly known as limits of 5/10—"five and ten"). Higher limits may be obtained, however, upon payment of an increased premium. Thus, if limits of 10/20 are desired, such coverage can be had upon payment of a premium based upon 120 per cent. of manual rates.

It is usual to provide that the carrier shall reimburse the assured for the reasonable cost of such immediate surgical relief as is imperative at the time of any accident covered by the policy. This obligation extends to any person except the assured.

Public liability coverage may be offered alone or in conjunction with property damage or collision coverage. In certain cases all three forms are included in a single policy. In others, the policy is for public liability only, but either of the other forms may be added by an endorsement.

Property Damage.

The automobile property damage policy protects an assured against his legal liability for injury to or destruction of the property of others on account of accidents due to the ownership, maintenance or use of automobiles.* The coverage does not extend to property owned by the assured or his employes or to any property in charge of the assured or any property carried in his automobiles.

There are limitations similar to those imposed upon public liability policies with reference to the operation of automobiles in speed contests or by persons under age. Likewise the coverage does not extend to accidents unless they occur during the period of insurance and within the boundaries of the United States and Canada.

The coverage is also similar to public liability as regards the obligation of the carrier to represent the assured in the investigation and adjustment of claims. In this case, however, the liability of the carrier is limited by the actual value (at the time of the accident) of the property injured or destroyed or in any event by a certain sum which is specified in the policy. The standard limit is \$1,000 per accident and is offered at manual rates. If higher limits are desired they may be obtained upon payment of an additional premium. Thus, a limit of \$5,000 may be secured if the manual rate is increased 36 per cent.

In recognition of the possibility of claims against the assured for damages on account of the "loss of use"† of property involved in an accident, coverage against this liability may be included in the property damage insurance. For this purpose the regular rates are increased 10 per cent.

Property damage is never made the subject matter for an individual policy. It is only written concurrently with public liability coverage and then either in a combination policy or by endorsement.‡

* See note on page 215 with reference to a change in the form of the automobile public liability insurance contract. The same situation is found in connection with property damage insurance.

† For example, a delivery truck is damaged and the owner is deprived of its use. He has a legal right to sue the person responsible for the accident not only for the cost of repairs but also for the loss of use of the services of the truck and the inconvenience and expense thus caused.

‡ Property damage may also be written concurrently with a fire policy.

Collision.

This insurance is designed to protect the assured against loss or damage to his automobile if such damage is caused by collision with another object, either moving or stationary. Whereas property damage coverage is intended to protect the assured against the legal liability arising out of damage to the property of others, this coverage applies to damage done to his automobile.

As in the case of public liability and property damage insurance, the accident must occur within the policy period and inside the boundaries of the United States and Canada. Similarly, the policy does not apply while the automobile is being operated in a race or speed contest or by a person under age. In addition to these there are two important restrictions peculiar to this coverage.

1. Loss or damage by fire arising from any cause is excluded.
2. The coverage does not extend to any loss or damage to tires due to puncture, cut, gash, blow-out or ordinary tire trouble or to loss or damage to any tire unless caused in an accidental collision which also involves other loss or damage to the insured automobile.

At present there are three forms of collision coverage: \$100 deductible, \$50 deductible, and full coverage. In the first, the loss arising out of each accident is deemed a separate claim and \$100 is deducted from the total amount of the claim, the carrier being responsible only for the excess above \$100. The \$50 deductible coverage is similar. In the third case the carrier is responsible for the entire amount of each loss.

There are no arbitrary limits imposed upon the liability of the carrier as in other forms of coverage. The liability is limited to the actual cost of repair of the damaged automobile or to the actual intrinsic value at the time of destruction.

In place of the clauses of public liability and property damage policies which govern the adjustment of controversies in which third persons are involved, the collision policy contains clauses governing the adjustment of controversies which may arise between the carrier and the assured. The carrier reserves the right to make investigations of the insured property at any time. In case of loss, provision is made for the adjustment of claims between the carrier and the assured. If an agreement cannot be reached concerning the value of the loss, two appraisers may be chosen, one by each party, and if these cannot agree they may select a third appraiser. The award in writing of any two appraisers determines

the nature and extent of the repairs to be made at the expense of the carrier or the value of the destroyed automobile. Each party pays its own appraiser and both pay the expenses of appraisal and the fee of the third appraiser. The carrier may exercise an option either to replace or repair damaged property or to pay the assured in cash. Either the assured or the carrier may take such steps as are necessary to recover, salvage or preserve the insured property in case of loss or damage without prejudice to the rights of either party and all reasonable expenses thus incurred shall be paid by the carrier.

Collision coverage is written either in a combination policy with public liability and property damage insurance, or by endorsement upon a public liability form.*

MISCELLANEOUS POLICY PROVISIONS COMMON TO ALL FORMS OF COVERAGE.

There are certain policy provisions which are common to all three forms of coverage and which are important enough to warrant mention.

The longest term for which any automobile policy is written is one year. The policy may be cancelled by either party upon proper notice. If cancelled by the carrier the premium is subject to adjustment upon a pro-rata basis. Thus, if cancelled by the carrier at the end of six months the carrier is entitled to retain one-half the annual premium. If cancelled by the assured the premium is adjusted in accordance with a so-called "short rate" table which places a slight penalty upon the assured and thus in some measure prevents excessive "twisting" of business from one carrier to another. Thus, if a policy is cancelled by the assured at the end of six months the carrier is entitled to retain 70 per cent. of the annual premium.

The assured accepts the responsibility of giving prompt notice of any accident in which the insured automobile is involved. This notice is sent either to the home office of the insurance carrier or to the office of one of its duly authorized representatives. It must be in writing and contain a full statement of details. Likewise, immediate notice must be given of any claim for damages or any legal proceedings which may be brought against the assured.

* Collision coverage may be written also by endorsement on a fire policy.

Except that he may furnish reasonable surgical attention immediately following the occurrence of an accident involving liability for personal injuries, the assured agrees to leave the investigation and adjustment of claims entirely in the hands of the insurance carrier. He may not voluntarily assume any liability or interfere in any adjustment or incur any expenses without the written consent of the carrier. He shall, however, upon request, assist in effecting settlements, in securing information and evidence and in the adjustment of legal controversies. In such cases, he is not obliged to incur any expense, this being taken care of by the insurance carrier.

All policies contain a subrogation clause. This provides that the carrier shall take over all rights which the assured may have to proceed against third parties who may be implicated in an accident. Thus, in case of a collision claim for which a third party is responsible the carrier, after indemnifying the assured, may proceed against the third party and reimburse itself either in whole or in part for any expenditure it has made.

Every policy contains certain warranties. The address of the assured must be given, also the name of the city or town in which the automobile is maintained and garaged. In addition, the assured must specify the city or town in which the automobile is principally used. The automobile must be described and certain information necessary to the proper computation of rates is required. It is usual also to incorporate a statement in the policy to the effect that the automobile is not and will not be rented to others or used to carry passengers for a consideration. If the automobile is used for livery purposes the proper classification and rate must be applied. Other essential particulars are likewise covered by warranties. Information concerning the prior history of insurance on the car is demanded. It is also usual to provide a warranty to the effect that the automobile is not being and will not be used for towing or propelling a trailer. In case coverage for a trailer is desired it can be secured upon payment of the proper additional premium.

As a general rule every policy provides an "omnibus coverage"; that is to say the policy covers, in addition to the interest of the assured, the interests of any person while riding in or operating the insured automobile with the express or implied permission of the named assured or an adult member of his household who is not a chauffeur or a domestic servant.

In the case of collision coverage, the number of insurable interests is not important because the value of the car limits the liability of the insurance carrier, and one rate is charged irrespective of the number of owners or persons interested in the property.

WHY COMPLETE COVERAGE FOR AUTOMOBILES IS NOT GENERALLY OFFERED BY CASUALTY COMPANIES.*

If there is a demand for complete coverage on the part of automobile owners, why is this not met by the issuance of a single policy by an individual carrier? It has been pointed out that this can be done in certain states although specific laws on the subject are not numerous. For the most part rulings by insurance departments govern and the usual rule is to have the field distinctly apportioned among the different classes of insurance carriers, fire and marine on the one hand and casualty on the other. Where these conditions obtain a single policy may be issued providing complete coverage only in case a coöperative arrangement is entered into by two carriers.

There seem to be several good reasons why it would be inadvisable to give general sanction to the principle of providing complete protection against all the misfortunes incidental to the use, maintenance and operation of automobiles:

1. The general field has been mapped out and each class of insurance carrier has a certain territory over which it exercises jurisdiction. Thus, there are certain generally accepted lines of insurance open to the casualty insurance company, the life insurance company, and so on. If this system is to be discarded in the case of automobiles it likely will be further modified in other cases. For example, the same logic may be advanced in favor of the issuance of a combination policy to cover all the possible forms of coverage required by a factory owner. Furthermore, insurance practices have developed laws with regard to reserves and underwriting principles which are entirely satisfactory if the present system is continued but which would become seriously complicated with a general change.

2. It is doubtful whether the demand cannot adequately be met by the present coöperative method of providing coverage. By this

* See paper on "Automobile Insurance: Should Fire Companies Be Authorized to Give Full Coverage, Including the Person?" by Henry D. Appleton, Deputy Superintendent of Insurance for the State of New York.

method a single policy is written and delivered to the assured, although as a matter of fact behind the scenes two insurance carriers are interested in the contract and the premiums and losses are shared. These internal adjustments are made without any inconvenience to the assured and the situation is, therefore, just as simple as it would be if one policy were issued by a single carrier.

3. Furthermore, it has not yet been demonstrated that the demand for complete coverage is great. As a matter of fact, even in those states where an individual carrier may write this form of policy there are few carriers who have exercised the privilege.

4. Finally, the specialization which has resulted from the American system of parcelling out the insurance field and assigning certain subjects to certain classes of carriers has been most satisfactory. It has been efficient and economical and it, therefore, should be continued unless there are strong reasons to the contrary.

CLASSIFICATION OF AUTOMOBILE RISKS.

A proper classification of risks is a prerequisite to the successful underwriting of any form of insurance. This is particularly true where the hazards are so diverse that a single rate cannot be made applicable to all risks. A description of the hazards involved in automobile insurance will be given later. At this point, however, it may be said that the hazards are of a wide range so that different methods of assessing premiums and convenient and logical classifications are essential to the proper conduct of the business.

In respect to the complication of the classification scheme, automobile insurance takes second place to no other line of insurance. The present scheme is not complete, nor is it thoroughly satisfactory. Like Topsy it has just grown up and additions and alterations in the old structure have been made as necessity arose. The structure itself has never changed, however, and the day is not far distant when radical amendments must be made, both in the direction of simplification and with the idea of developing a more thoroughly consistent and logical scheme.

At present there are six general classifications. These are known by titles which are not entirely descriptive and which will, therefore, require explanation.

The general classifications are as follows:

1. Private Pleasure Automobiles.
2. Private Pleasure Automobiles with Occasional Commercial Use.

3. Livery Automobiles.
4. Public Automobiles—Other than Livery Automobiles.
5. Commercial Automobiles.
6. Manufacturers and Dealers Automobiles (Including Sales Agency, Garage or Station Risks).

Private Pleasure Automobiles.

These are automobiles of the private pleasure type propelled by gas, steam and electricity. The classification also includes two-wheeled motorcycles of the private pleasure type and bicycles designed to carry a single person which are equipped with the recently patented motor wheel.

Care is taken to restrict the use of the classification to cars operated exclusively for private use and business and professional calls. Thus, commercial delivery is not permitted. Nor may the car be rented or used for carrying passengers for a consideration.

For public liability and property damage coverage, private pleasure cars until recently were classified with reference to insurable horse power. This was obtained by the use of the horse power rating formula of the American Society of Automobile Engineers. The elements necessary to obtain a result from the formula were the bore of the cylinder and the number of cylinders. Thus, the insurable horse power for a car with six cylinders of 5-inch bore was 60.

On April 1, 1919, a radical change was made in the method of classifying these automobiles. A two-way classification was substituted for the former classification according to insurable horse power. One of these depends upon the manufacturers' list price, the other upon the use to which the car is put and who is permitted to drive it. There are four list price classifications, each of which includes cars falling within a certain range of list price. This is defined as "the manufacturers' list price for the type and model of the automobile insured, to which list price must be first added the cost of special bodies, winter tops and other additional equipment." Provision is made for three "use and driver" classifications under each list price group. The first of these includes cars of the private pleasure type used exclusively for "private purposes" and driven only by the assured named in the policy who must be the owner or one of the owners. "Private purposes" is defined as including "personal pleasure and family use" and ex-

cluding "regular and frequent use for business or professional calls and commercial delivery." The second classification is similarly restricted as to use but is unrestricted as to driver. Anyone may drive—the owner, members of his family, a chauffeur or any other person who receives the owner's permission. The third classification is unrestricted as to driver. As regards use it is limited only by the provision that it must not include a car of the private pleasure type used either for commercial delivery or for the carrying of passengers for a consideration. It covers the numerous private pleasure automobiles used in business by agents, solicitors, professional men and others.

For collision coverage automobiles are classified according to the manufacturers' list price. In this connection there are a few practical difficulties which are met by special rules. For example, when two bodies are used interchangeably on the same chassis, the higher priced body determines the classification for collision insurance. Again, where a special top or body is used, the extra cost of this feature must be added.

As a general rule, this classification does not cover trailers. If coverage for trailers is desired it may be obtained upon payment of the proper additional premium. For liability and property damage coverage this premium is a certain percentage of the premium for the highest rated automobile to which the trailer is attached. In the case of collision coverage the cost of the trailer itself determines the classification and rate.

Private Pleasure Automobiles With Occasional Commercial Use.

This general classification, as the name implies, includes cars of the private pleasure type which are occasionally used for commercial delivery purposes. These are of three types:

1. Automobiles of the private pleasure type which, without alternation in chassis or body, are occasionally used for the transportation or delivery of merchandise.
2. Automobiles of the private pleasure type used for rural free delivery.
3. Automobiles equipped with bodies of the private pleasure type and commercial type which are used interchangeably.

Automobiles of the first two descriptions are classified as ordinary private pleasure automobiles. However, the rate for public liability and property damage insurance is obtained by applying a

special loading to the rates for these classifications. For collision insurance no loading is applied to the regular private pleasure rates.

For automobiles of the third type the commercial classification determines the rates to be charged for public liability and property damage coverage. For collision coverage both the commercial and the private pleasure classifications and rates must be considered and that rate which is the highest is charged.

If trailers are attached to any of these automobiles the classification of the trailer for public liability and property damage insurance follows that of the automobile to which it is attached. The rates are a specified percentage of the normal rates for these classifications. For collision coverage trailers are separately classified according to list price and the classification and rate depend upon the list price.

If a private pleasure car has been altered to permit of the transportation or delivery of goods or merchandise it is considered a commercial car for the purpose of classification and rating.

Livery Automobiles.

This classification covers automobiles of the private pleasure type used for pleasure and rental purposes which are subject to call from a garage. The automobile must not be equipped with a taximeter, nor must it be offered for hire at stands, hotels, or stations, or on the public highway or other places of public resort. In addition, school buses used exclusively for carrying children to and from school, and automobiles of the private pleasure type used as funeral carriages are included. All these automobiles are embraced by a single classification for property damage coverage. There is a subdivision of this classification for public liability coverage, two classifications being provided according as the liability of the assured to the passengers carried in the insured automobile is or is not excluded from the policy coverage. For collision coverage the automobiles are classified according to the manufacturers' list price.

Public Automobiles Other than Livery Automobiles.

This classification includes automobiles which are kept for hire at public stands—for example, taxicabs, omnibuses, sight-seeing busses and jitneys.

For public liability and property damage coverage the automobiles are classified according to carrying capacity and the use to which the car is put. Thus, there are classifications for hotel omnibuses, taxicabs, other public vehicles designed to carry not more than twelve passengers, and so on.

There is a provision similar to that for livery automobiles as regards coverage for the public liability hazard, specific rates being quoted for each classification for the inclusion and exclusion of the passenger hazard. For collision coverage the automobiles are classified according to the manufacturers' list price.

Commercial Automobiles.

These are automobiles specially designed for the transportation of goods or merchandise and propelled by gasoline, steam or electricity; also three-wheeled motorcycles or tricycles designed for delivery purposes. In addition the following specific types of automobiles are covered:

1. Two-wheeled motorcycles of the private pleasure type used by telegraph companies to deliver messages.
2. Industrial and dock trucks—the low four-wheeled trucks which are driven by electric power and are used for carrying baggage at railway stations, terminals or docks or in factories as substitutes for hand trucks.
3. Tractors of all descriptions—farm and otherwise.
4. Automobiles of special design and use, such as ambulances, hearses, fire engines, etc.

For public liability and property damage coverage, policies include the so-called loading and unloading hazards—that is to say, the coverage applies to accidents incidental to the loading and unloading of goods and merchandise. The coverage also extends to any incidental pleasure use which may be made of the insured automobile.

For the purpose of classifying these automobiles for public liability and property damage insurance a series of classifications is provided. These are based upon the kind of work in which the automobile is engaged. Thus, there are classifications for automobiles used by department stores, ice dealers, dyers and cleaners, etc. If an automobile is engaged in more than one line of business it is assigned to the classification which produces the highest rate.

For collision insurance, commercial automobiles are classified

by manufacturers' list price. In view of the fact that many of these automobiles are provided with specially built bodies and that, therefore, in many cases the manufacturers' list price does not include anything except the cost of the chassis, special provision is made that where this condition obtains the cost of the body and other additional equipment must be added to obtain the proper collision classification.

Trailers are treated as in other general classifications. For public liability and property damage insurance the trailer follows the classification of the automobile to which it is attached and the rate is obtained by applying a differential to the rate for this classification. For collision insurance trailers are classified according to the manufacturers' list price.

Manufacturers' and Dealers' Automobiles.

These are of two types:

1. An automobile of any description used by a manufacturer for the purpose of demonstrating it or its parts.
2. An automobile of any description used by a dealer, garage or automobile station for the purpose of demonstrating or testing the automobile and the parts thereof, or for other purposes incidental to such business including renting for the carrying of passengers or the property of others.

These automobiles are all thrown together into one general classification for property damage coverage. As regards public liability there are four sub-classifications depending upon whether or not the coverage will extend to the use of the automobile for livery purposes or whether or not the passenger hazard is to be included. For collision coverage the risks are grouped according to the manufacturers' list price.

PREMIUM BASES.

Public Liability and Property Damage Coverage.

For all classifications of automobiles except manufacturers' and dealers' automobiles, the unit of exposure is one car insured for twelve months and rates are quoted per car annum.

For manufacturers' and dealers' automobiles, there are four alternative methods of premium computation.

1. The first is the so-called "named chauffeur basis." A policy

may be written naming the drivers who will operate automobiles of any make or type and limiting the coverage to the operation of automobiles by these drivers or their successors or substitutes in case of illness or discharge. Where this basis is used the unit of exposure is one named driver for a period of twelve months and the rates are quoted per driver per annum. The use of this basis is limited to automobiles employed for demonstrating and testing.

2. The second is the "specified car basis." In this case the type and make of each car is specifically described in the policy and the unit of exposure is one car per annum. Thus, rates are quoted per specified car per annum.

3. The third method is the "payroll basis." It is used for garage and sales agencies. The unit of exposure is \$100 of payroll and rates are quoted, as in the case of compensation and liability insurance, per \$100 of payroll. Rates are quoted for inside and outside payroll separately, but each rate applies to the total payroll. These rates vary. Each branch or separate location is considered individually and rates are provided for the first \$10,000 of payroll, for the next \$15,000 of payroll, and for any payroll in excess of \$25,000. Separate rates are provided for gasoline or steam-propelled automobiles and motorcycles.

The rates for the first three classifications do not cover the hazards incidental to the renting of automobiles for private pleasure or commercial purposes. If such coverage is desired, it can be obtained upon payment of a premium based upon the livery earnings. Separate rates are provided for livery earnings of automobiles of the private pleasure and commercial types. The unit of exposure is \$100 of gross livery earnings which is defined as the total amount charged by the assured whether collected or not. The assured must agree to keep complete and accurate records of these earnings.

4. The last method of rating these automobiles is known as the "car output"* basis, each risk requiring individual consideration and special rating.

Collision.

For collision coverage all types of automobiles are rated on the same basis. The unit of exposure is one car insured for a period of twelve months and rates are quoted per car per annum.

* The basis for premium calculation is the number of cars manufactured or repaired during the policy period.

HAZARDS.*

The hazards of automobiling from the viewpoint of casualty insurance carriers are created by various conditions, most of which have something to do with causing collisions between automobiles and persons or property. A loss involving public liability or property damage will arise out of the same general sort of occurrence, viz., the coming in contact of the assured's automobile with the persons or property of others. The same is true in general of collision coverage, although of course the car itself may also be damaged by skidding, jumping embankments, etc. Instead of attempting to specify the hazards of casualty automobile insurance, therefore, I shall briefly outline the more fundamental conditions which are responsible for the occurrence of accidents or which influence the adjustment of losses. These contributing factors are not specific enough to be dignified with the term "hazards." They cannot be isolated and individually evaluated as are the hazards of workmen's compensation insurance. Each must be considered in relation to the others and only by taking them in the aggregate can a proper conception of hazards be obtained.

The elements of the hazard may be classified in two ways; first, according to whether the element is a physical or a personal one; second, according to whether it applies to the individual risk or contributes to the environment in which the risk is situated and to which all risks within a given territory are exposed.

The important physical factors of the individual risk are as follows:

1. *The Purpose for Which the Automobile is Designed.*—A motorcycle, a car designed for private pleasure use, a commercial delivery car, a ten-ton truck and an omnibus, all present peculiar individual characteristics and each represents a different possibility from an accident point of view.

2. *The Purpose for Which the Automobile is Actually Used.*—An automobile is not always used for the purpose for which it was designed. Thus, cars of the private pleasure type are used for rural free delivery, for the carrying of merchandise and as livery vehicles. The actual use as well as the designed use is important. For example, a car of the private pleasure type which is used by a

* This analysis of automobile hazards is based upon the author's personal observation and judgment. The reader has a perfect right to differ with the presentation either in whole or part.

professional man in business or by a merchant for delivery purposes does not present the same hazards as a car which is used exclusively in private family life.

3. *The Method of Propulsion.*—An electrically driven automobile for obvious reasons does not present the same hazards as an automobile driven by gasoline or steam.

4. *Weight.*—The weight of the automobile is not independent of its other physical characteristics; it has relation to the design, the use to which the automobile is put, etc. Nevertheless, it is in itself an important element of the hazard. The relative results produced in collision by a fourteen-ton truck and a light delivery truck are in no way comparable. In the one case, there is a certain momentum, a difficulty of management and a force which in impact with objects of normal size is overwhelming. In the other, while there may be speed, there is possibility of control and greater chance of complete destruction of the automobile itself.

5. *Speed.*—An automobile which is incapable of attaining high speed represents less hazard than one which without any appreciable effort can be operated at high speed. In this connection the horse power is a criterion if the car is propelled by gasoline or steam.

6. *The Degree to Which the Automobile is Used—that is, the Mileage it is Driven During a Year.*—The exposure to accident varies directly with the number of miles the automobile is operated during the period of insurance. If it is garaged part of the year, the exposure is appreciably reduced. If, on the other hand, it is in operation constantly, the potentiality of accident is substantially increased. The mileage also is an important factor in determining the deterioration of the car. It is reasonable to expect that as the car deteriorates, it represents a greater hazard, particularly from the point of view of collision coverage for as time goes on the equipment will require more frequent repair and will be more easily damaged. As regards public liability and property damage coverage, it is apparent that as wear and tear affect the car and its equipment, the chance of accident is increased.

7. *The Physical Equipment Which the Automobile Carries to Prevent Accidents.*—If a car is equipped with an efficient bumper, proper head and tail lights, a windshield, non-skid chains and all the other accident prevention apparatus now on the market, it undoubtedly is a safer risk than another car which is deficient in this respect.

The physical factors which affect all risks within a given territory may be enumerated as follows:

1. *Traffic Density*.—Traffic density ordinarily is related to population density, although there need not necessarily be a close relationship between the two. In some territories of small population traffic density will be great because the territory may be in immediate proximity to a large city, or it may lie along a popular highway, or it may be a vacation center. Traffic density is important because naturally if there are many cars on the road, the probability of accident is increased. It has been stated that on the average there are fifteen cars on every mile of road in the United States. As this ratio increases, new conditions and new possibilities of accident will be developed.

In this connection it is interesting to note the recent stimulus in the use of motor trucks for the transportation of freight. The auto truck has certain advantages over other freight carriers. Under normal conditions it can do the work of six teams; consequently, it is efficient for short hauls. For reasonably long hauls it can compete with railroad transportation on the basis of efficiency, promptness of delivery and economy. It has the advantage that merchandise can be delivered to the door, thus avoiding cartage charges. These facts are becoming more and more generally recognized. Automobile truck lines now operate in some cases for distances of 800 miles on fixed schedules.

2. *Population Density*.—Population density is related to many other factors. As it increases the traffic density undoubtedly will increase and there will be a greater exposure of pedestrians to risk. On the other hand, it is likely that with greater population density there will be more efficient traffic regulations and this will have a contrary effect upon accident frequency.

3. *Number of Automobiles*.—Given two territories of the same population and all other things being equal, the hazard undoubtedly is greater where the ratio of automobiles to population is greater.

4. *Traffic Regulations*.—Under this heading a number of items may be mentioned. An efficient code of traffic rules is without question the greatest accident preventive. There are certain fundamental rules of traffic which every driver should know and respect. The system of licensing cars and drivers makes it possible for the authorities to insist upon this elementary knowledge. It has become a custom to have separate branches of municipal police known as

traffic departments, the business of which is to study and regulate traffic problems. In certain outlying districts where it is impracticable to use policemen for traffic control, silent automatons equipped with red lanterns and other distinguishing marks are installed for the purpose of guiding traffic and forcing it to observe proper channels. The one-way street is a method of avoiding difficulty where streets are narrow and congested. These are only random examples of what may be accomplished by intelligent regulation.

5. *Road Conditions.*—Road conditions may either increase or decrease hazard. Good roads invite use, encourage traffic and impel speed. Wide streets increase the possibility of accident to pedestrians. Narrow and crooked streets congest traffic and create dangerous conditions. If roads are properly planned, it should be possible to divert traffic so that it will avoid centers of congestion. Thus, the highways of the future may be built so that they will not pass through cities or towns. Much is being done by road clubs and public safety commissions, not only to stimulate the demand for good roads, but also to prevent accidents. For example, this movement has almost entirely eliminated dangerous railroad grade crossings.

6. *Climate.*—Automobiles are now used the year around so that all sorts of weather conditions must be recognized. Slippery roads and fogs and haze in the atmosphere present distinct dangers to traffic and pedestrians and thus create acute traffic problems.

7. *Topography.*—Naturally the hazards are increased if the country is hilly and it is necessary to build roads with sharp curves or steep grades.

The personal elements inherent in the individual risk are separate and apart from the car itself. The term "personal" has been used because the hazard is created by persons who own and operate automobiles. Thus, the following inquiries are important:

1. *Who Owns the Automobile?*—In the case of collision insurance much depends upon the disposition of the assured to be fair and to avoid fraudulent claims. In public liability and property damage insurance, the ownership is of some importance because undoubtedly there is a tendency for juries to make greater awards if the owner is wealthy or if the car which causes the damage is engaged in the service of a corporation.

2. *Who Drives the Car?*—The driving of the automobile is one

of the most important elements of all. If the driver is careless or ignorant accidents will occur. If he is careful and well versed in the operation of automobiles, the hazard is reduced.

In this connection it may be noted that the lowest rate for private pleasure automobiles is applied to automobiles driven exclusively by the owner. There is still discussion and controversy with reference to the question of chauffeur driving.

The personal factors which create the environment to which all risks within a certain territory are exposed are similarly created by persons. Some of them may be mentioned as follows:

1. *The Automobile Drivers of the Community.*—Speed maniacs, joy riders and reckless drivers create distinct hazards for the careful driver. In some territories this is a most important element as, for example, in the southern states where a large percentage of drivers are negroes. The problem created by the employment of a large number of crippled ex-soldiers and sailors as chauffeurs already has received recognition in England. "Dry" and "wet" zones in close proximity establish lanes of traffic to be avoided by peaceful citizens.

2. *Character of the Population.*—It has been estimated that 70 per cent. of personal injuries are the fault of the injured and 30 per cent. the fault of the driver. If the public is well educated and has received instruction in public safety, accidents to pedestrians probably will be few in number. On the other hand, where there is a large population of uneducated persons contrary conditions may obtain. Furthermore, a moral hazard is found in certain territories because of the tendency of the public to present unreasonable and fraudulent claims. It is a well-known fact that a large element of alien population has a decided influence upon public liability losses.

3. *The Prevailing Sentiment in the Community towards Automobiling and Automobile Owners.*—In some localities municipal officials and juries are inclined to be very severe because of antagonism toward automobile owners. This spirit is probably passing away in large degree with the general acceptance of the automobile as a means of locomotion.

4. *Local Laws Affecting Accidents and Claims for Damages Arising Therefrom.*—The statutes of the territory may create a distinct legal hazard if adverse or they may improve the situation as where a definite limit is imposed upon claims for damages for personal injury.

HISTORY OF RATE MAKING.

The first rates for automobile casualty insurance were promulgated long before the automobile became generally accepted as a part of our daily life. In 1899, which is the first year for which statistics regarding the automobile industry in the United States are available, the value of the output was slightly over \$1,000,000. By 1903 the output had reached a valuation of \$16,000,000. The automobile industry during this period was in its infancy, but as early as 1901 manuals of liability insurance contained rules with reference to the classification and rating of automobiles for public liability insurance.

It was natural that these first classifications and rates should follow the practices of teams insurance, for in those days automobiles were beginning to take the place of teams and in the absence of any experience the extension of the form of teams insurance to include coverage for automobiles was a logical step.

In the manual of May, 1901, the reference to automobile insurance was very brief. Public liability coverage only was mentioned and it was provided that with certain exceptions the rates for all automobiles should be double the rates for teams insurance. The exceptions were not numerous and included cabs, hacks, hansoms, omnibus lines, private vehicles and others. It is interesting to note that for all classifications except private vehicles the passenger risk was included. This of course was a very rough classification, and the rates were purely judgment rates.

The analogy of automobile to teams insurance, while it was a satisfactory basis for a beginning, was soon found to be inadequate and it was not long before it became necessary to issue a separate manual for automobile insurance and to develop individual forms of coverage, classifications, premium bases, and underwriting rules for this class of business. The rates continued to be judgment rates, pending the accumulation of a sufficient volume of experience.

It was unfortunate that the statistical phase of automobile insurance was not given attention at the inception of the business for one of the difficulties which soon confronted underwriters was created by the fact that there was no standardized system of compiling automobile experience and reporting it to a central bureau. Notwithstanding this handicap a considerable volume of experience was accumulated and the beginning of scientific rates was made in

the automobile revision of 1914. At that time rates were established for all three forms of coverage.

The movement toward uniform statistics was given new life in 1916 by the promulgation by the National Workmen's Compensation Service Bureau of a statistical plan for automobile insurance. This plan represents a complete analysis of automobile underwriting methods and provides for uniform methods of compilation and reporting to the bureau. It became effective as of January 1, 1917, and the first experience compiled in accordance with its provisions will be due this year. Nevertheless, pending the accumulation of results under the uniform plan, revisions of rates were accomplished in 1915, 1916, 1917 and 1918 upon the basis of considerable volumes of experience obtained under the old statistical systems of the companies. For example, at the time of the last revision there was available for the establishment of public liability rates, an experience based upon an exposure of 294,000 cars of the private pleasure type and 60,000 commercial cars.

DIFFICULTIES IN RATE MAKING.

A review of the hazards of automobile casualty insurance will convince anyone that rate making is not a simple task. There are numerous elements of the hazard which can be demonstrated to have an appreciable effect upon the rate, but which are of such character that it is difficult and at times impossible to measure them by any analytical method.

Several examples of difficulties which arise in the practice of rate making may be given.

1. Mileage is one of the most important factors in determining the public liability hazards of automobiles of the private pleasure type. Still it is impracticable as a basis for insurance rate making for the reason that up to the present time no effective device has been perfected which will guarantee the measurement of mileage and at the same time prevent anyone with fraudulent intentions from falsifying the record.*

2. The measurement of the hazards of environment requires some method of establishing rates for geographical territories. At present this is accomplished by a zone system which does not produce entire satisfaction because it inevitably results in a series of

* Mileage is used by certain underwriters in England as a basis for premium calculation. However, it never has been tried in this country.

sharp lines of demarcation with consequent abrupt changes in rates. It is not uncommon to find, as an extreme case, two automobile owners whose rates for the same type and model of automobile are considerably different merely because one of them happens to reside on one side, the other on the other side of the imaginary boundary line of a territorial division. What is the solution? It is obvious that these inequities will persist until a simple workable plan of shading the picture is devised which will recognize centers of high and low hazard and at the same time grade rates so that instead of hard and fast zones there will be gradual changes with no shock or breaking points.

3. So far commercial automobiles have been classified and rated for public liability and property damage coverage on the basis of use alone; that is to say, any car in the service of a baker takes a certain rate; any car in the service of a brick mason, another rate, etc. Undoubtedly from a theoretical point of view, use is not a complete criterion of hazard. Weight, speed, motive power and numerous other factors are vitally important, but to recognize and measure them without complicating the underwriting procedure beyond all reason, is a problem which still remains unsolved.

These are random examples of the many problems which face underwriters in connection with the determination of rates. Many of these problems will be solved as reliable statistical information becomes available in greater volume because the solution depends entirely upon statistical analyses. Others probably never will receive a thoroughly satisfactory solution because of the inherent impossibility of obtaining a correct measurement of hazards which at the same time is consistent with underwriting principles. In other words, automobile insurance rate making is not unique. It suffers from all the ills of insurance rate making in general. The theoretically perfect method of procedure is often impossible of application because practical underwriting demands a scheme of rates that can easily be applied and that limits the possibility of fraudulent manipulation to a minimum. Where practice conflicts with theory, practice dictates the answer to the problem.

This should be borne in mind in criticizing the present automobile rates. They are based upon the most logical analysis of the problem that can be made in the light of available statistical information. As statistical and underwriting experience is gained, there undoubtedly will come a tendency to make greater refine-

ments and this will have the result of producing a more and more equitable distribution of premium income and a closer approximation to the actual hazards of individual risks.

RATES.

The scope of this paper will not permit a complete description of rates. All that can be attempted is a general statement of fundamental principles and an illustration of their application to some particular form of coverage and type of automobile.

The gross or manual rate is made up of two elements, (1) pure premium, or provision for the payment of losses and legal expenses, and (2) expense loading or provision for the payment of the expenses of administering the insurance, the taxes imposed upon premium income by state and federal authorities and a reasonable underwriting profit.

The pure premium is the loss cost per unit of exposure. Thus, in the case of commercial automobiles the pure premium represents the losses and legal expenses which a single car is expected to produce during a period of twelve months. The first approximation to the pure premium for any classification is obtained from the experience which insurance carriers have accumulated. For rate making purposes experience is usually reduced to a statement giving the ratios of losses to exposure. Thus, if in a certain classification 10,000 insured cars have produced losses and legal expenses aggregating \$200,000, the indicated pure premium is $\$200,000 \div 10,000$ or \$20.00.

The indicated or experience pure premium has much or little significance depending upon several conditions:

1. It is obvious that the reliability of experience increases as the number of risks under observation increases. A single car does not produce experience of value because the exposure is so small that it is more likely than not that the result will be irrational. If there is no accident the indicated pure premium will be 0; if an accident does occur it may be as high as \$10,000. Numerous risks must be considered if the law of averages is to have full play and it is only when the experience covers a broad exposure that the indicated cost can be considered trustworthy. One of the difficult problems in rate making is the determination of the amount of credence which can be attached to experience. This is one place where trained judgment is essential and the intelligent underwriter

will mix judgment and experience in the proper proportions in establishing pure premiums.

2. One weakness inherent in all insurance rate making rests on the fact that the available experience is always representative of the past, whereas the rates must be designed for the future. This introduces a second element of judgment for it is necessary not only to know the past conditions which are reflected by the experience, but also to forecast the conditions of the future and to anticipate them in the rates. If the cost exhibits a tendency to fluctuate the law, if one exists, by which this phenomenon is controlled must be observed and measured. This usually can be done statistically, but it is apparent that facts will carry the investigator only to a certain point. From that point he must proceed upon his own resources. The casualty actuary with his training in the theory of probabilities is properly equipped for this service and a legitimate field awaits him not only in automobile insurance, but in other branches of casualty insurance as well.

In automobile casualty insurance at least two conditions have been noted which require correction of past experience if it is to be used for the determination of future rates.

1. The first is the difficulty of properly estimating claims. Naturally, as past experience is the only available basis for rate making it is necessary to bring it as close to the present as possible. This creates a problem because an experience record is not complete until all the policies have expired, all the accidents have occurred, and all the resulting claims have been adjusted. By regulating the compilation of experience it is possible to insure complete exposure and accident data. It is, however, impossible to arrange to secure the latest experiences and also to know exactly what the claim cost will be. This condition is more important in some forms of insurance than others. It creates a serious difficulty where, for example, claims are subject to litigation as in the case of public liability coverage. In this case there will be a number of claims in the most recent experience concerning which little is known. The statistician must rely upon the claim department to estimate the liability for these claims. This is not simple because there is no definite standard of settlement as in the case of workmen's compensation and some other insurances. There has been a tendency to underestimate the value of these deferred claims. The error has not been great, and by reviewing past experience as

it gradually develops to maturity the tendency can be measured. Obviously, it is necessary to introduce a factor in the experience to raise the cost to an ultimate basis before it is used for rate making.

2. Secondly, conditions have been changing rapidly. The war had its effect upon costs of repair; it also curtailed the automobile output. Automobiles are now used the year around, whereas a few years ago it was customary, in certain localities at least, to put them up for the winter. The number of automobiles in use is increasing. The automobile is being used for purposes not dreamed of five years ago. Juries are forming the habit of excessive awards. All these and many additional items must be recognized and reflected in the rates so that the teachings of past experience may not lead us astray in the future. This is usually accomplished by the establishment of a factor to measure the rate of changing conditions.

Concerning the expense loading, little need be said except that it is built up by a cost-accounting method. Upon the basis of a review of the universal practices of insurance carriers the various expense factors are analyzed and each is expressed in its proper percentage of the gross rate.

The gross or manual rate is obtained by combining several elements.

If,

P = gross rate.

p = selected pure premium.

i = rate of change in conditions anticipated for the future as compared with those reflected by the experience used as the basis for the establishment of pure premiums.

e = loading for management expenses, taxes and underwriting profit expressed as a percentage of the gross rate.

then,

$$P = \frac{p(1+i)^*}{1-e}$$

* This formula is developed as follows:

$$P = Pe + p(1+i),$$

$$P(1-e) = p(1+i)$$

or

$$P = \frac{p(1+i)}{(1-e)}$$

It is understood that p is established by the underwriter from the pure premium experience properly modified for the underestimate of outstanding losses. It, therefore, need not necessarily be the indicated pure premium. It will approximate this if the exposure is large, otherwise it will be fixed by analogy to the pure premiums for other classifications or by underwriting judgment.

With this general statement of fundamentals it will be interesting to outline in brief the method pursued in establishing rates for a single form of coverage and a certain type of automobile.

As an example, let us assume that rates are desired in two territories for public liability coverage for a certain type of automobile for which four classifications are provided. Assume further that with proper allowance for the underestimate of outstanding losses, the experience in the four classifications of automobiles for the entire United States is as follows:

PURE PREMIUM EXPERIENCE FOR THE U. S. A.

Classification.	Indicated P. P.
1	\$ 9.56
2	13.99
3	19.50
4	25.06
<u>All classes</u>	<u>15.02</u>

This experience is carefully analyzed by the underwriter and as a result of choice and graduation the following selected pure premiums are established:

SELECTED PURE PREMIUMS FOR THE U. S. A.

Classification.	Selected P. P.
1	\$10.00
2	15.00
3	20.00
4	25.00

Next let us assume that changing conditions are such as to require the establishment of a factor of 1.10 to measure them. Also that the loading for management expenses, taxes and underwriting profit is 45 per cent. Then gross rates for United States may be obtained as follows:

DETERMINATION OF GROSS RATES FOR U. S. A.

Class.	Selected P.P.	Increasing Cost Factor.	Expense Loading.	Gross Rates.
1	\$10.00	1.10	.45	\$20.00
2	15.00	1.10	.45	30.00
3	20.00	1.10	.45	40.00
4	25.00	1.10	.45	30.00

The next problem is to translate these rates into rates for the two territories in question.

Carrying our assumptions further, let us assume that it is found that a comparison of the total experience for all four classifications produces the following results:

DETERMINATION OF TERRITORIAL DIFFERENTIALS.

Territorial Division.	Indicated P. P. All Classifications.	Differential.
U. S. A.	\$15.02	1.00
A	7.51	.50
B	30.04	2.00

Upon the theory that the fundamental relationship of hazard as between classification can be ascertained from the combined experience for the United States, it is obvious that a set of rates can be obtained for each of the territorial divisions in question by the simple calculation of applying the territorial differential to the U. S. A. gross rates as follows:

DETERMINATION OF RATES FOR TERRITORIAL DIVISIONS.

Class.	U. S. A. Gross Rate.	Territory A.	Territory B.
1	\$20.00	\$10.00	\$40.00
2	30.00	15.00	60.00
3	40.00	20.00	80.00
4	50.00	25.00	100.00

It will be noted that if a fundamental law of hazard can be established, the problem is simplified. For example, the statistician need go into the refinement of classification experience only for the United States. For the territory he need only produce experience for the form of coverage and the type of automobile. It is not known definitely at the present time whether this plan is practicable. The validity of the assumption is, therefore, always carefully checked with reference to the actual classification experience

for individual territories. For example, in practice, the classification experience would be carefully considered for the two territories and an adjustment would be made for any classification where the experience indicated this to be necessary.

CONCLUSION.

There are many interesting phases of the subject which I have found it impossible to cover. For example, experience rating is being practiced in connection with the determination of rates for fleets of automobiles and garages; there is a distinct safety first movement in the field of automobile insurance; just as teams insurance was extended to cover automobiles in earlier days so today automobile insurance is being utilized as the starting point for the development of airplane insurance, etc. These subjects, however, while they are of interest have no direct bearing on the fundamental principles of automobile casualty insurance. If I have done nothing more than point out the complicated structure of this line of insurance and to indicate the many problems which still await solution, I shall feel that the paper has accomplished its purpose.