THE WORLD'S GREATEST GAMBLING HOUSE— LLOYD'S.*

FROM a philosophical point of view, all insurance is gambling. On the risk hand is the underwriter betting that a certain thing will happen, on the other hand is the premium payer betting that it will not happen, or *vice versa*. As the difference between the amount of insurance and the premium widens the moral aspect naturally changes and the element of "protection" subdues all ethical misgivings, and the fact that in the case of a fire, a shipwreck, the loss of a limb, or life, a comparatively large amount of money is received for a comparatively small outlay, has come to be recognized as a modern social necessity.

The placing of insurance against the outcome of famous trials has been a common practice at Lloyd's since the days when the underwriters first met in Lloyd's Coffee House in Tower Street, London.

That these risks are taken at the behest of gamblers always, the Lloyd's men deny, though as early as 1768 an article appeared in the London Chronicle condemning the coffee house as a "meeting-place for all manner of illicit gaming," and complaining that bets were made there "under the guise of insurance" on all the happenings of the day, from the outcome of elections to the trials of peers. It is said in defense of such risks as that placed on the Thaw case that thereby is furnished an insurance on the reputation of the lawyers engaged. The legal talent conducting a defense may by this means provide against the damage to prestige involved in an adverse verdict.

An example of the activity of the London underwriters in New York was the insurance taken out last summer by the managers of the Vanderbilt Cup race on Long Island. It is not revealed what the amount of the policy was or the premium paid, but the risk was against suits for damages arising out of accidents. It can scarcely be contended that Lloyd's centuries of experience gave the underwriters any data of value on the relative danger of the Vanderbilt course, and it may be supposed that the premium was high. It will be recalled that it was during this race that the first fatality among the spectators occurred, when Elliott F. Shepard's car struck a man who had stepped out on the course, killing him instantly.

The business of the Lloyd's agency as a corporation is marine insurance purely, but since the seventeenth century days, when the nucleus of the present organization was formed among the frequenters of the coffee house of Edward Lloyd in old Tower Street, the individual members of the group have been willing to take up any risk for a proper consideration. Then the safe return of a ship to port was a gamble at best, and insurance was little more than a gamester's business, but in these latter days the members of Lloyd's, who have reduced marine risks to a science as exact as life insurance, resent the likening of their trade to the bettors', and make claim with some reason that with the experience of more than two centuries it is possible to discount fate in every branch of human affairs with something like the scientific accuracy of the mortality table.

Of the thousands of odd insurances placed at Lloyd's, one of the longest standing is that held by a tradesman on the Strand, whose shop stands in the shadow of the Nelson monument. He has carried a policy for a generation against the possible damage to his premises should the monument fall. A certain group of underwriters make a specialty of insuring against the calamity of twins or triplets. This risk, it is claimed, has been reduced to a truly scientific basis, and the premium is arrived at only after a careful consideration of the family history of the insured and other data on which long experience has proved dependence can be placed.

Another of the legitimate sources of Lloyd's profits is established through the agency's information of the inside of European politics. During the South African war it was the general belief in the grain trade that the Czar would issue a ukase against the shipment of Russian wheat from the ports of the Black Sea. After a quiet investigation of the situation, Lloyd's established a premium rate against the contingency on which thousands of pounds' worth of insurance was taken out by grain merchants who looked for large trade in Russian breadstuffs with the army in the Transvaal. Lloyd's information that the ports would remain open proved correct, and the premiums were clear profit.

In recent years one of the largest losses sustained by the agency was through the postponement of the coronation ceremonies at the time of King Edward's illness. Thousands of stands had been erected along the route of the coronation procession, on which Lloyd's had sold insurance. The policies were against the prospective profits, and a rate of from 10 to 25 per cent had been made on the stands, according to positions, the idea of the underwriters being that only heavy rain would prevent their being filled to the utmost and the gross receipts reaching full expectations. The postponement of the ceremonies fell heavily on the Lloyd's underwriters, not only because of the losses on the stands, but out of the large number of policies sold to tradesmen on goods laid in against the expected holiday demand.

One item on which the loss mounted into thousands of pounds was the risk on their profits taken out by the dealers in the purple cloth, who had counted on selling millions of yards for decorations. The aniline dye used faded so quickly that the cheap cloths were worthless by the time the coronation finally took place. At the same time Lloyd's did a thriving business in

the sale of policies on the King's life, a means taken by tradesmen to insure themselves against the heavy curtailment of profits which would have resulted from a period of general mourning in London.

Another wholesale source of gain to the underwriters in recent years was during the smallpox scare in London in 1902. Policies were issued not only against individual infection, but against the losses to shopkeepers in case of quarantine. The panic was widespread and the policies were in great demand at high premiums, against which the losses were inconsiderable.

War and the lives of crowned heads have always been the greatest source of the Lloyd's policies outside of the agency's legitimate business of marine insurance. It was during the period of almost continual disturbance in Europe between 1775 and 1815 that the Lloyd's brokers took their place as the leading underwriters of Europe. Never a cargo went to sea that was not insured against capture, and the success of the British navy in taking care of its own made profits great. In later times, though premiums have gone down with the diminished risk, a war cloud always means money in the pockets of the underwriters. During the Japanese-Russian conflict the shipments of contraband to both parties were inevitably insured at Lloyd's.

Lloyd's part in marine affairs is as wide as the seas. The rooms in the Royal Exchange are the news center of the fleets of the world. There are kept the records of every ship's master in the service of commerce, and the character of every hull fit to sail the seas. The beginnings of the intelligence service which has given the agency its fame and has reduced marine insurance to a science were in the gatherings of men of affairs in the coffee house of Edward Lloyd in Tower Street. The first mention of the little public house appears in an advertisement printed in the London Gazette in 1688, wherein Edward Lloyd offers a reward for the apprehension of a certain tall, dark, pockmarked individual who had lifted a watch or two. The proprietor himself, whose name is now known to the ends of the earth, wherever ships touch, was not concerned in the gambling business, which was then all that marine insurance could be called. His patrons gradually made the place a general exchange for news of the outside world, and in 1692, when the coffee house moved to Lombard Street, the proprietor undertook to gather the intelligence that came to his tables in the form of a printed gazette. In Lloyd's News, which he started about that time, was printed not only shipping news, but general information, and it was his dabbling with outside affairs that brought down the government censorship on his little sheet and stopped its issue after a brief existence.

Lloyd's List, which is the name still retained by the official organ of the agency, was founded in 1726, confining itself wholly to marine intelligence, and the paper continues to this day the oldest newspaper in England except the London Gazette. During the first century of its existence Lloyd's was conducted without any organization, but in 1774, after a succession of financial scandals inseparable from the eighteenth century fever for bubble speculation and insurance gambling, an association of insurance underwriters and brokers, calling itself the "New Lloyd's," took up its headquarters in the Royal Exchange, the predecessor of the present building, which is as much of a show place in financial London as the Bank of England or the Stock Exchange. The form of policy adopted by these associates continues unchanged to the present day but for the substitution of the more prosaic formula of "Be it Known That" for the pious opening phrase of the original form, "In the name of God, Amen."

The Lloyd's, after a long period of prosperous underwriting of war risks during the troubled years between 1775 and 1810, was investigated by Parliament and in 1811 was again reorganized. In 1871 the associates were incorporated for the threefold purpose of "carrying out marine insurance," "protecting the interests of its members," and "the collection and diffusion of intelligence and information with respect to shipping." At about the same time the "intelligence and information" branch of Lloyd's was separated from the insurance business in the formation of "Lloyd's Register of British and Foreign Shipping," whose rating is now the standard of all classification among the ships of the world's commerce.

Marine risks are the one class of insurance officially recognized at Lloyd's. The underwriting members of the body, who number about six hundred out of the total of 2,500 members, each deposit with trustees upon admission security to the value of \$25,000. This fund, amounting in all to about \$15,000,000, is the security corresponding to the capital and surplus of an insurance company. It applies, however, only to marine risks, and all of the strange policies issued by the underwriters are backed only by the credit and good faith of the men who underwrite them. Every coast that commerce touches is watched by an agent of Lloyd's, and all the marine insurance companies of the world depend upon the intelligence flashed to London from these outposts and on the information as to vessel and master supplied by the Lloyd's Register. It is from Lloyd's rating symbol for the best in hull and equipment that the familiar "A-1" is derived.

Besides the underwriting members, who are the bankers of the association, Lloyd's has two other classes of members, the brokers who get the business and the subscribers who want information only. At the door of the underwriters' room is the great register of shipping, in which the history of every registered hull afloat is set down. Not only the dry facts of its

condition and worth of hull, but its casualty history, for the luck of a vessel, as well as its material worth, enters into the calculations of the underwriters. Another book contains the story of every skipper in the commercial service, his birth and antecedents, his commands, and what has befallen them. The inexorable register hangs over the head of every master mariner, and he knows that the eye of Lloyd's is ever watching and that every mishap to his command will be surely recorded against his name in the book in London.

Carefully guarded from the public is the "Confidential Index," whose contents, too, are a large factor in the estimation of risks. Here the ship owners are tagged and billeted, their financial standing is duly rated, and their past dealings with the underwriters are kept track of. It is in this index, too, that the records of disgraced captains are kept, mercifully removed from the knowledge of all but the members of the agency.

When a broker has a policy to write he takes his memorandum to the underwriters' room, where they scrutinize it individually, and decide how much, if any, they will take of the risk. It is an individual bargain between the underwriter and the broker. Each underwriter is the representative of a group of the underwriting members, who, as has been said, are the bankers of Lloyd's. These men, after looking over the policy individually, will put down their initials for whatever amount they choose. The broker goes from one desk to another until the entire amount of the risk has been initialed on the slip. When the policy is made out the signatures of the underwriters are filled in, with the amounts taken, and the members of each banking group also attach their signatures to back up their underwriters. In this way the liability is taken personally by all concerned, and the profits also are divided individually. The security fund of the agency is used only to make good the failures of members, should such occur.

Among the underwriters those who make specialties of other forms of insurance are well known, and it is these men who take the odd risks, for which the agency is the world's market. The security for the payment of such policies is entirely a matter of good faith and credit, and Lloyd's as a body assumes no responsibility.

One of the famous attributes of Lloyd's is the ship's bell which hangs above the crier's rostrum. The news of every disaster at sea or the safe arrival in port of a ship long overdue is announced from this pulpit by the tall, red-cloaked crier of the Exchange. As he mounts the platform the bell is struck for silence, and when this bell, from the old ship-of-war "Lutine," is tolled as the crier announces the sinking of a ship or the decision of the board that a vessel long overdue must be lost, under English law all aboard become officially dead. The name of the ship and all that is known of the casualty is then put on record in a room which has been given the name of the "Chamber of Horrors." Hope is not abandoned, however, without taking into account all the contingencies which experience has taught the directors to look for. Unless there have been eyewitnesses to the sinking of the ship, Lloyd's waits until the owners as well as the committee agree that no hope is left; even then the rule requires that a bulletin praying information of the missing ship be posted for a week before the "Lutine's" bell is tolled in signal that losses will be settled.

ILLUMINATION AS AFFECTING THE EYE.*

By DR. WENDELL REBER.

THE most delicate photometer we have is the retina of the eye; it is the original of all photometers. We use the photometer sometimes in our work to ascertain various data. In certain people excessive tobacco smoking will reduce the acuteness of light perception. In others, lead workers, for instance, you will find very greatly reduced light perception, especially if their vocation is such that they inhale the lead dust. Painters are not so liable to reduced light perception as are workers in lead fixtures.

The retina, which is about as thick as a piece of tissue paper, is in itself a most marvelous chemical laboratory. It is the camera, dark room, and the whole thing in one, and the most wonderful chemistry is done there that is done in the world. It takes the picture, develops it, and presents it to your vision all in one operation.

The retina is backed up with a pigment layer, to do away with radiation, and if people work under too high a light stimulus, a certain amount of the protection got from the pigment is used up. These people usually begin to show an intolerance of ordinary light. Of course, to-day, when you begin to talk about ordinary light, the question arises, "What is ordinary light?"

There is a greater temptation to abuse the human eye to-day than there ever was. Nowadays light can be instantly produced in any hour of the twenty-four. Not so in the days of candles, when people went to bed early. We turn night into day in almost every possible way, and in almost every way we use our eyes in a manner that our forefathers never did. Everyone does now about three times the work in 16 or 17 hours that people did 100 years ago, and the consequence is many people are wearing glasses.

Of course, the matter of lighting public buildings, schools, etc., is one of the big present-day problems of this country. Twenty-five years ago the Germans were prompted to go into this matter because their generation was rapidly becoming near-sighted. Japan is

* A discussion before the Philadelphia section of the Illuminating Engineering Society.

* New York Times.

pushing them hard for that honor. With the Germans the cause is found in three things: Abominable type, insufficient illumination, and poor hygienic conditions, all of which they are making terrific struggles to overcome. They went at their schools and applied their principles in the right way, and every German scientific publication of to-day is published in the Gothic type, and they are trying very hard to use it in their textbooks. The average person who studies Greek or German is in danger of becoming near-sighted.

lowing one another at certain intervals in the path made by the first discharge. The writer was unaware at the time that others had experimented in the same line and had published their results.

The camera was moved by hand, being swung from right to left and back again, each swing lasting about one second and covering an angle of about 60 deg., which was also the angle of the lens. The apparatus employed was an ordinary magazine plate camera, which for all ordinary purposes is the most convenient

0.5 millimeter apart, and from there for a distance of 10 millimeters are a series of discharges close together, forming a broad band. The dark space which divides this flash is a cloud through which the discharge is passing. Another interesting fact about this flash is that the path of it is spiral shaped, the motion is from right to left, or opposite to the motion of the hands of a clock, looking downward from the cloud. Fig. 3 was obtained October 1, 1903. We have here a flash composed, first, of two bright discharges close to-

FIG. 1.—LIGHTNING FLASH TAKEN JULY 17, 1902.

FIG. 3.—LIGHTNING FLASH TAKEN OCTOBER 1, 1903.

It is evident that we are developing a large proportion of near-sighted young people in our schools, and the ratio of those who are far-sighted is much lower than it ought to be. Every schoolhouse ought to be constructed to get the greatest amount of light consistent with the safety of the building. For the minimum amount of light there should be not more than five square feet of floor space for each square foot of glass. The German government intends creating a commission of architects or engineers to decide how the lighting of schools shall be carried out, and this question will receive attention as schools are built.

PHOTOGRAPHING LIGHTNING WITH A MOVING CAMERA.*

By ALEX LARSEN.

LIGHTNING, with its accompaniment of thunder, has always exerted a fascinating influence on the thinking mind. It is not strange that a people living in an age when the laws of nature were less perfectly understood should have associated this beautiful and awe-inspiring natural phenomenon with the powers and attributes of their gods.

The ancient Norsemen recognized in the rumbling of the thunder the approach of Thor, their most powerful god, in his heavenly chariot, drawn by his two he goats; and in the lightning flash they saw the path cleaved through the air by the never-failing hammer "Mjolner," wielded by the mighty arm of Thor when battling with the enemies of the gods, the hammer always returning to his hand. The myth is beautiful, and it would seem as if its authors had noticed the peculiar flickering of most lightning flashes and associated it with the forward and return movement of the hammer.

The principal object of this paper is to place before

FIG. 2.—LIGHTNING FLASH TAKEN JULY 11, 1903.

its readers certain facts to account for this flickering of lightning flashes.

In the latter part of the summer of 1901, while taking some ordinary pictures of lightning, the idea occurred to the writer while noticing this flickering that if the camera be moved in a circle at right angle to the flash the picture ought to show a widening of the flash, if it was composed of separate parts, and thereby also determine its duration. The attempt to do this was made that year, but without success. It was repeated again in 1902, and on July 17 several successful exposures were made which clearly showed that most flashes are composed of several discharges fol-

lowing one another at certain intervals in the path made by the first discharge. The writer was unaware at the time that others had experimented in the same line and had published their results.

Several more pictures were obtained in 1903. The three most interesting ones up to that year are shown in Figs. 1, 2, and 3. Fig. 1 shows a flash obtained on July 17, 1902. The discharge took place between two clouds. It will be noticed that it is composed of a number of separate discharges (or rushes) and bands; as many as thirty-four can be counted on the negative. As the flash covers about half of the plate, and as the approximate speed of the camera was about one second to cover the plate, or 60 deg., it follows that the approximate duration of this flash was about half a second. Fig. 2 shows a flash obtained on July 11, 1903. This flash is interesting for several reasons. It is composed of fourteen separate discharges, the

gether, then there appears to be an interval of about a fourth of a second, which in all probability was filled in with a number of fainter oscillations (the lines running across seem to indicate that), and at the conclusion of the flash are four fairly bright rushes.

In the summer of 1904 copies of some of the photographs were sent to the Smithsonian Institution for examination, and through the suggestions and assistance of the experts of that Institution a new method of moving the camera was devised.

A spring-motor movement (of the kind used to operate revolving stands for exhibiting goods in show windows) was procured and mounted inside a table specially constructed for the purpose, and a stand for supporting the cameras was fitted to the central shaft.

As the speed of the motor was too slow, the fly-vane shaft was removed and the vane moved to the next shaft, which was lengthened so as to extend under the table. Thus arranged the fly-vane could be made to

FIG. 4.—MOVING CAMERA APPARATUS FOR TAKING LIGHTNING FLASHES.

first one being the brightest, and having side branches pointing downward, proving that the first discharge passed from the cloud to the earth and that the resistance which it had to overcome must have been excessive (the side branches prove that). At a distance of 3 millimeters from the first rush is another discharge following the same path, but without side branches (what appear as such are really branches from the first rush). At a distance of 12.5 millimeters from the last discharge will be seen two rushes

revolve in a liquid placed in a vessel under the table, thereby preventing much of the vibration and getting a more uniform speed. Fig. 4 shows the arrangement of the apparatus. The table top is removed in order to show how the motor movement is placed; the fly vane is seen under the table. The stand is usually revolved at a speed of one revolution in ten seconds, which the writer has found to be the most suitable for ordinary purposes. The reason for employing a motor movement with a uniform speed to move the camera

* The study of lightning flashes herewith presented was aided by a grant from the Hodgkins fund of the Smithsonian Institution. The paper is republished from the annual report of the Smithsonian Institution.