

war-paint over the whole of her side facing the enemy was ablaze.

In turn the "Borodino" and then the "Orel" were selected as the principal target. In six minutes the former was struck twelve times with 12-inch, and thirty to forty times with 6-inch and 8-inch shells. The eyewitness of this tremendous drama has this to say of high-explosive shells: "To realize the terrific effect of this shelling, one must consider that a shell filled with Shimose powder is really a small torpedo; that each 12-inch shell striking an unarmored portion made a hole 7 feet high and 6 feet wide; that the fragments of these shells were minute particles that filled the air like driving mist; and that a dense black smoke settled down after each explosion, blinding and suffocating all in the vicinity. One sailor is known to have been struck 130 times by fragments from a single shell."

The great lesson of the conflict, as deduced by this spectator, is that gunnery and tactics must ever be the determining factors in naval battles between equal forces. In the sortie of August 10, the Japanese made poor shooting. Between that date and the battle of Tsushima, no effort was spared to perfect their marksmanship. It is estimated that, between them, the 12-inch guns fired 1,275 shots, and of these 19.6 per cent were hits. The average range was 5,000 yards and the condition of the atmosphere hazy. Lieut. White remarks very aptly that this record is enough to make all who think, think hard. On the other hand, the Japanese had little to contend with in the way of interference by the fire of the Russians, the "Mikasa" being hit only a few times throughout the battle.

Although telescopic sights were used on the guns by the Russians, they were greatly interfered with by mist and spray and in some cases rendered quite useless. Coal had been stowed everywhere on the ships, and the shock of the shells and firing stirred up coal dust from corners and crevices, making it impossible to see either with or without the telescopes; moreover, shells falling short and striking the sea, deluged the ship with salt water and blurred the telescopes, leaving them salt-incrusted.

#### POISONOUS EGGS.

All substances are poisonous when they are injected in a certain quantity into the circulatory system of an animal. The weight of the substance injected as compared with that per pound of the animal forms what is called its toxicological value. Numerous experiments have been made with a large number of substances, especially by Prof. Bouchard, according to Cosmos, who has studied the toxicological value of the physiological media; but up to recent times no one had investigated the toxic value of eggs. This has now been done, however, by M. Loisel, who has experimented upon the eggs of the common hen, the duck, and the turtle.

M. Loisel's mode of operation is as follows: He takes the powdered yolk of a duck's egg, for example, treats it with a 20 per cent solution of salt, and injects into the veins of a rabbit until the animal dies. In order to kill a rabbit, it takes about 55 grains of the substance per pound of animal, say 180 grains for a rabbit of an average weight of  $2\frac{1}{4}$  pounds. If an experiment be made with the same substance by injecting it into the general cavity, the toxicological value diminishes and the quantity required is from 375 to 450 grains.

The yolk of the hen's egg is less poisonous, and that of the turtle more so than that of the duck. The albumen of the egg also is poisonous, the toxicity increasing from the hen to the turtle. If we desire to know the cause of the toxicity, we must seek it in the chemical composition of eggs. These are composed of the yolk and the white. The white represents typical albumen soluble in distilled water, and coagulable by heat. The yolk contains a special substance, ovovitelline, which is insoluble in water, soluble in dilute saline solutions, and associated with organic phosphorated compounds, called lecithines, and cyanic ferruginous compounds called hemoglobins, at the expense of which is formed the hemoglobine of the blood of the young chicken.

It is to nervine, a substance allied to the lecithines, and the toxic power of which is very great and which exists in extremely small quantity in the yolk, that is due the toxicity of eggs, as also to toxalbumens (bodies as yet little known), which are highly poisonous. According to M. Loisel, all the toxic substances of eggs act upon the central nervous system.

What is of consequence for us is not the toxicological value of eggs from an experimental viewpoint, but the toxic value of eggs ingested by the natural tracts, the cause of the putrefaction of eggs, and the physiological phenomena to which putrified eggs can give rise.

Eggs, even when very fresh, give rise to severe cases of poisoning, although this depends on individual susceptibility, and according to M. Linossier, is more apt to occur in dyspeptics. The quantity ingested may be exceedingly minute, and the toxic symptoms may exhibit themselves even in a young child. Mention is

made of a fourteen-months-old child, who, in consequence of the absorption of an egg, had a nettle-rash eruption, and, two weeks afterward, a second eruption caused by a cream that had been given to it.

Such phenomena generally exhibit themselves by the appearance of urticaria. The substance that produces this, and is called ovotoxine, is analogous to those that cause similar effects and are met with in strawberries, mussels, and sea fish, which give rise to accidents known by the name of botulism. We know that some individuals are very sensitive to the action of these substances.

There is here also a receptivity of the individual, and, as a consequence of these phenomena, eggs cannot be employed in cases in which there is a lesion of the digestive apparatus at some points of its passage, especially in typhoid fever, in which the intestine offers a wide surface of denudation into which the various toxins of the eggs might infiltrate. In all such complaints, we should prefer milk sterilized and boiled, and as free as possible from all toxins and microbes.

Along with the ingestion of normal eggs we may mention that of poisonous ones, of which neither the taste nor odor gives any hint as to their toxicity. This phenomenon is due principally to microbes that have entered the egg at the time of its formation, that is to say, into the very ovary of the duck and hen.

A remark apart must be made in regard to the toxicity of the eggs of the duck. This fowl as a general thing lives amid somewhat dirty environments, and it is possible for a considerable quantity of organic matter in decomposition to enter their organs and infect them. The egg in forming becomes contaminated with these substances rich in microbes, and thereby becomes toxic.

It is to eggs thus contaminated that may be attributed those toxic phenomena sometimes exhibited by creams. These latter, in fact, are not submitted to a very high temperature during their manufacture, while a temperature of at least 60 deg. C. would be required to destroy the pathogenic microbes of the egg. This is not compatible with culinary processes. From this point of view, since non-fecundated eggs are less toxic than fecundated ones, it is important to reject the latter as food for children and invalids. Finally, a third way in which eggs may become toxic after they are laid is by the penetration of microbes through the porous shell. These microbes have been studied by Zordanhofer, who divides them into two groups. The first group, which gives rise to a putrefaction which results in the production of sulphureted hydrogen, is the most common alteration. Ten species of this group have been described under the name of *Bacillus oogenes hydrosulfurens*.

The second group gives rise to a slightly different putrefaction the odor of which recalls that of human excrement. This putrefaction, which is much more rare, is produced by a bacterium called *Bacillus oogenes fluorescens*. All these organisms need air for their development. It is therefore necessary to keep eggs from contact therewith by varnishing the shell or coating it with vaseline or milk of lime.

The use of decayed eggs is extremely dangerous. Dr. Cameron has called attention to a case of poisoning that happened in a convent at Limerick, Ireland, in 1895, after a meal at which had been served a cream in which a bad egg had been used. Seventy-four women who partook of the meal were poisoned, and four of them died.

An endeavor has been made in this article to recapitulate the causes of the poisoning of eggs and the damages to the system that may be caused by eating them. But it must be said that poisoning by eggs is of relatively rare occurrence, and that that produced by spoiled ones is exceptional.

#### WHAT THE GLIDDEN TOUR PROVED.

At the termination of the third annual tour of the American Automobile Association at Bretton Woods, N. H., on the 28th ultimo, thirteen out of forty-eight contestants for the Glidden trophy still had perfect scores. The one car that was penalized two points on this day lost these points on account of an unnecessary stop, and solely through the carelessness of its occupants. Besides these thirteen perfect-score cars, one car had one, and two had two points each, while three had three and one five points against them. Seven cars had from six to fifteen points charged against them. Besides these, two contestants for the Deming trophy made perfect scores. Thus, in all, fifteen cars made perfect scores; fourteen had penalizations ranging from one to fifteen points.

No one who has not been over the route that was traversed, or at least some of the worst portions of it, at high speed in an ordinary touring car can realize what a wonderful performance was made by these twenty-nine cars. The shocks and strains they encountered were undoubtedly more severe than are those received by racing cars traveling at extremely high speed on good roads. None but the best springs and axles can stand such jolts and bumps as the touring cars received in endeavoring to adhere to the schedule. This, it is

true, was lowered, after the first few days of the tour, from an average speed of 18 miles an hour to one of 15; but on such flinty, sandy, and rough roads as were met with, it was difficult to make up time lost from punctures or other troubles, even with this low average speed. The plan adopted by most of the contestants was to run as fast as they could up to each checker, spend the fifteen or twenty minutes they had gained in making repairs, pass the checkers on time, and start full tilt for the next control. If several punctures or blowouts were had in a single control, they were almost sure to lose points. One 30-horse-power touring car, for instance, after having its third puncture in one control, made a run of 10 miles in 19 minutes, running on a flat front tire of the mechanically-fastened type. The inner tube was melted, and the rim was so hot as to burn the hands of the men when they attempted to remove the tire. During some stages of the run, new axles and springs were put on several of the cars, and the time thus lost was successfully made up. As an endurance test and obstacle race, the tour was unsurpassed.

Among the forty-one contestants for the Glidden and Deming trophies that finished the tour, no less than twenty-five different makes of cars are represented. Of the four foreign cars that started, but one, Mr. S. B. Stevens's 50-horse-power Darracq, finished. Nearly all of the cars were four-cylinder machines of from 24 to 50 horse-power. The only exceptions were double-opposed-cylinder Reo and Maxwell cars of 16-horse-power, the small Maxwell speedster of 12 horse-power (used as an advance confetti car), and a single-cylinder Oldsmobile runabout of 8 horse-power, used as a repair car. A half dozen White steam machines of 18 horse-power also competed. On the last day's run Mr. Walter White's machine was ditched, in order to avoid running into a wagon. The gasoline tank was punctured on a rock, and the car caught fire, and was completely demolished. The five air-cooled cars in the tour proved their worth, two of them, the 40-horse-power Knox (which carried five to seven people) and the 30-horse-power Marmon, winning perfect scores. In this connection a word of praise should be given the 16-horse-power double-opposed-cylinder Knox baggage wagon. This was the only commercial vehicle in the tour, and it successfully transported 3,000 pounds of baggage throughout the event.

Above all else, the tour has demonstrated that American machines will stand fast driving on rough forest roads without serious damage to the cars or their mechanism. Engine and gear troubles have practically disappeared, and the only things that are to be feared are the breakage of springs and axles and the giving out of the tires. Numerous shock-absorbers were tried out and found wanting in this test; and were it not for the pneumatic tires, which have been greatly improved during the past two years, such a tour would be impossible of accomplishment.

Immediately after his car had been released, Ernest Keeler, who drove a 30-horse-power Oldsmobile touring car, left Bretton Woods for a record run to New York city. The start was made at 12:10 on Sunday the 29th ultimo, and the car arrived at Herald Square on Monday at 2:28 P. M. The elapsed time was thus 26 hours and 18 minutes. The actual running time, however, was but 21½ hours, and the average speed was 24 miles an hour. During the night run from Concord, N. H., to Springfield, Mass., an average of 30 miles per hour was made. The car covered 16.56 miles per gallon of fuel (the consumption being 30 gallons), while three-quarters of a gallon of oil is said to have been used. No water was put in the radiator during the run, although the motor was running with the car stationary for over five hours. The motor was not stopped from 12:10 P. M. on the 29th until 2:45 P. M. the following day, thus making 26 hours and 35 minutes of continuous operation—certainly a good demonstration of motor reliability. Probably the motors of many of the other contesting cars would have been capable of a like performance, so reliable in operation have the motors of most gasoline automobiles now become.

#### THE COLOR OF WATER.

It was long ago discovered that the natural color of pure water is blue, and not white, as most of us usually supposed. Opinions have not agreed on the cause of the green and yellow tints; these, it has been discovered by W. Spring, are due to extraneous substances. Dissolved calcium salts, though apparently giving a green tint, due to a fine invisible suspension, have no effect on the color of the water when adequate precautions are taken. The brown or yellow color due to iron salts is not seen when calcium is present. The green tint is often due to a condition of equilibrium between the color-effect of the iron salts and the precipitating action of the calcium salts.

Orders for 562,000 tons of steel rails have been booked ahead by American railways for 1907. These figures include the contracts placed by the Northern Pacific, Great Northern, Chicago, Milwaukee, and St. Paul, Chicago, Burlington, and Quincy, Illinois Central, and the Wisconsin Central railroads.