

previously lowered to the ocean bed from anchor wells in the bottom of the boat. These anchors serve a double purpose, inasmuch as they, as well as a large section of the keel of the vessel, may, in the event of accident, be cast adrift, and the boat thus lightened will, of course, rise to the surface.

A unique feature of the Lake type of submarine boat is found in the fact that the craft is equipped for travel upon the bottom of the ocean, being fitted with two large steel wheels which are fitted on the keel line, one in advance of the other, and which may be raised or lowered at will. The propellers push the boat forward just as when she is afloat, but the wheels tend to keep the vessel upon a straight course, once the bearings have been taken. The "Protector" is also fitted with several other adjuncts which have not appeared in any other submarine craft, among the number being a device which indicates exactly the distance traveled on the bottom, and a telephone equipment which enables persons on the submerged vessel to communicate with those on shore. This would, of course, prove of advantage in war operations. The lines of the hull are such as to give the vessel a great reserve of buoyancy in every condition save that of total submergence upon the bottom, and this ability to secure absolute horizontal stability without imposing other than a reasonable movement of weights therein will it is claimed, enable the newcomer in the submarine field to be readily controlled in rough weather.

#### HEAD-ON COLLISION OF TRAINS IN LOS ANGELES, CAL.

The terrific effects of a head-on collision of trains, each running about twenty miles per hour, are shown in the accompanying illustrations. The accident occurred October 18 in Los Angeles, Cal., on the Southern California Railway. A northbound freight train of about twenty-five refrigerator, box and coal cars drawn by a ten-wheel locomotive collided with a string of eight passenger coaches drawn by a switching locomotive. The switching locomotive was in front of the string of coaches, but was running backward southbound. The engineer of the freight train was hurled back from his cab on to the tender, and his injuries may prove fatal. The other men in the train crews escaped without severe injuries. The trains carried no passengers.

#### Burning Pulverized Coal.

The promises of economy gains from burning pulverized coal have for years led to persistently recurring experiments and each new venture in the field has been heralded with claims of final success. After all, however, experience in every instance seems to have ultimately demonstrated that it is difficult to obtain combustion of such fuel with as small an amount of air per pound of fuel as can be obtained in the best practice with coal fired on an ordinary grate, and this has always tended to make the economy lower than with the usual method. Besides this, the power required to operate the coal pulverizer and feeder has counted against the efficiency of the plant as a whole, and there is generally some difficulty from the collection of ashes and unconsumed particles of coal in the back connections of the boilers. Judging from all available data, these drawbacks still remain to be overcome.—Cassier's Magazine.

Gustave A. Barth, of Stapleton, S. I., has invented a very simple and convenient duplex wafer for fastening two sheets of paper together. The wafer is made in disk form and consists essentially of a many-ply body of paper, the layers of which are fastened together in the usual manner. The faces of the body are coated with an adhesive substance. It is simply necessary to moisten the coatings, to apply the wafer with one face to one of the sheets of paper, and then to press the second sheet upon the other face of the wafer in order to fasten the two sheets together. In separating the sheets of paper it is necessary only to pull the sheets apart, so that the body of the wafer separates along the division lines of the plies or layers. One ply with its coating will adhere to the one sheet and the other ply with its coating to the other.

#### The Successors of the Sea Serpent.

Ever since the sea serpent, which annually bobbed up in the newspapers during the dog days, disappeared in the depths of the ocean, apparently never again to trouble credulous readers, the imaginative reporter has drawn upon the animal kingdom for harrowing tales. Acting on the principle that a story is all the more credible if told with minute details, picturesque phenomena are described in lengthy accounts, in which, however, the name of the observing scientist, or of the particular spot where the observation was made, is never mentioned. Very often a foreign scientific journal is cited as the source of the writer's information. If an attempt be made to verify these fantastic descriptions, it is often found that the particular journal from which the information was supposed to be derived has no existence. For that reason the impression seems to prevail among journalists that a very large number of the most interesting occurrences in animal life are simply figments of the imagination.

An ingenious German writer has collated the accounts that have appeared in European papers, and gives us the results of his work in an entertaining article. The first animal that attracted his attention was the American turtle, which according to an imagi-

belted fish were found to return constantly to the brook where they were hatched. Doubtless the late Baron von Münchhausen of blessed mendacious memory would enjoy these stories to the top of his bent. The critic in question states that it is hardly credible what good German burghers will swallow. Everybody knows that a salmon, after having attained a certain size, swims toward the sea, and returns to his old haunts only after he has increased his weight by several pounds. A metallic band fastened about him during the early stages of his growth would manifestly kill him.

Such stories have been published, not once, but many times. They recur at regular intervals, like the old mother-in-law jokes in the comic papers. The subjects most frequently treated in Europe are the large fish that weighs so many pounds that it takes many men to carry it; the old lady who knew Frederick the Great when she was a child; the faithful dog who was sold to some one who carried him off a hundred miles, and who returned with unerring instinct to his former master; the spider tamed by an imprisoned criminal (sometimes the spider is a fly); and the cat that defends her master's canary from the attacks of a rival cat.

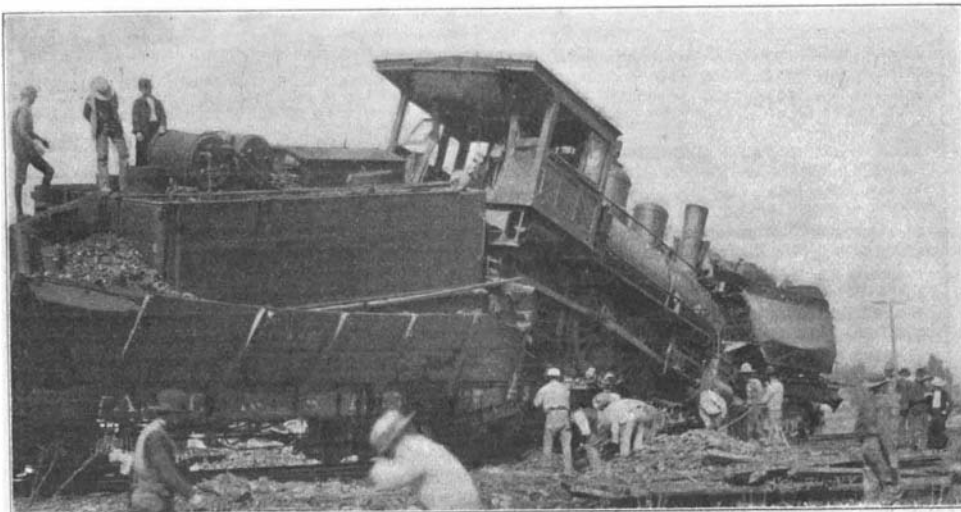
It is perhaps pardonable to tell a few interesting lies of events that may have happened during the lifetime of a fictitious old lady. But the stories of animal life that figure so prominently just now both in American and European newspapers are sources of error often harder to eradicate than the tales of the living young to which the eel is said to give birth, or of the badger which is said to live from its own fat in winter-time.

#### Astronomical Problems.

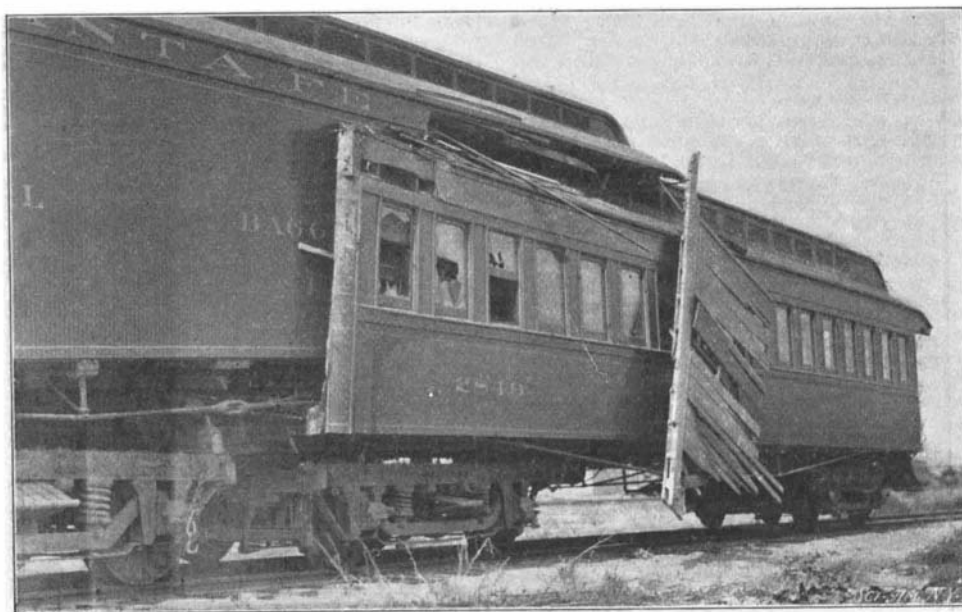
Some time ago Prof. Darwin of Cambridge pointed out that if a star revolved on its axis with a certain velocity, that of a few hours, the star would tend to divide into two, and the form it would take before complete separation would be that of a dumb-bell, or rather two pears joined top to top. This deduction was purely theoretical. During the past two years an examination of the light changes of some recently discovered variable stars reveals this very condition of things. For example, one star in the southern sky goes through a certain regular series of light-changes in seven hours; and an examination of these light-changes indicates that the star is a twin system, the two bodies composing it being in contact. This dumb-bell system revolves round the common center in seven hours, the most absolute confirmation of the theoretical conclusions. Then there is another variable star in the southern sky the light-changes of which show that the two stars composing the system are no longer in contact, separation has just taken place, the nexus between them is broken, and two worlds, full born, have started on that outward spiral which in the course of ages will carry them far remote from one another.

The Scholer suction dredge "Nicolaus," which is working on the Kaiser Wilhelm Canal, is claimed to be a great improvement on the ordinary suction dredge. By using a head of peculiar construction on the suction pipe, the volume of water lifted with the dredged material can be regulated and limited to the minimum quantity required. This head is a closed receiver, into which the material is pushed, and into which the necessary amount of water can be admitted. The material and water are mechanically mixed in this receiver and then lifted by the pumps into hoppers of 400 cubic meters capacity. In working in compact soil, water under pressure can be admitted to the head to assist the excavator.

A patent case involving a thing no less important than a bung hole occupied the attention of the courts in Toledo, Ohio, recently. The decision was rendered in the case of Ulrich Ruedy against the Toledo Bushing Company, and decreed that the plaintiff was entitled to one-fifth interest in the invention for improving bung holes and bushing. The plaintiffs were instructed to assign Ruedy that portion of the profits.



The Locomotive of the Freight Train After the Collision.



The Forward End of the Passenger Train After the Collision.

#### HEAD-ON COLLISION OF TRAINS IN LOS ANGELES, CAL.

native reporter was subjected to a very rigorous examination, in order to show what an intellectual beast it was. The creature was made to thread a most intricate labyrinth in order to reach its food. The turtle was said not only to have succeeded in accomplishing this task, but even to have picked out the very shortest way to the trough. In a second and more difficult journey, the animal accidentally rolled down an incline. Ever since that accident the turtle insisted on rolling down the incline, simply because it found that the journey could thus be more quickly completed. To such a fantastical tale, a very serious journal devoted half a column, despite the fact that it constantly bemoaned the limited amount of space at its disposal.

The inhabitants of the watery element have also exercised a peculiar attraction upon the newspaper writer. Not long ago that sense of place which is said to be one of the most peculiar faculties of fishes was made the subject of a picturesque article. It was stated very positively that every salmon during the spawning season returns to the very brook in which it was itself hatched. Who was the observer of this interesting phenomenon is not stated. It was, however, very seriously asserted that "a scientist" had belted certain salmon with metal bands, and that these