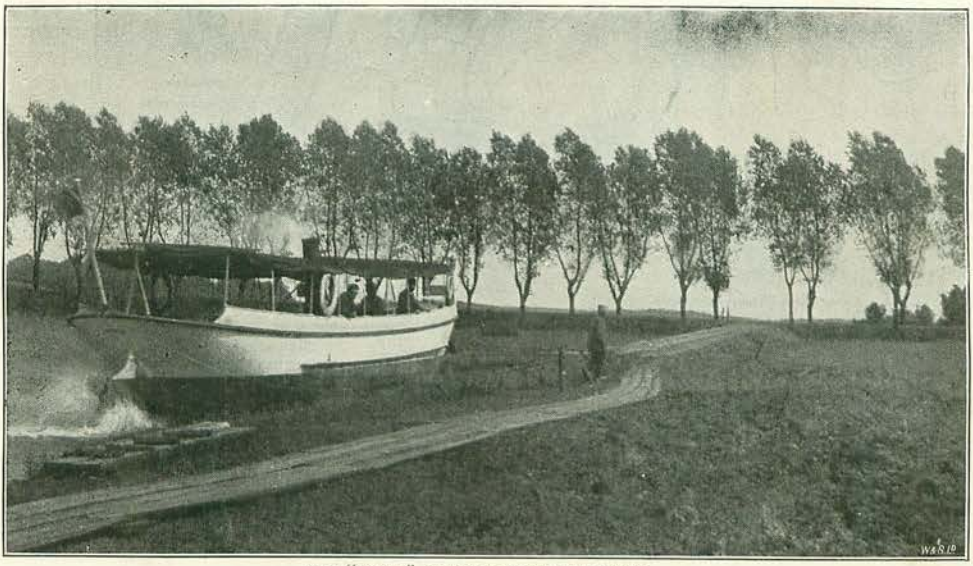
The Amphibious Boat.

By James Walter Smith.

THIS might be called the crocodile of boats, for she seems as much at home on land as in water. She comes up out of the water, as shown in our first illustration, crosses a narrow strip of land on a little railway, and descends into the water again with utmost grace of motion. During her short career of three summers she has safely carried over forty thousand people, most of whom have been intensely attracted by the novelty of the thing. For the *Swan* is, I believe, the only boat of her kind in the world.



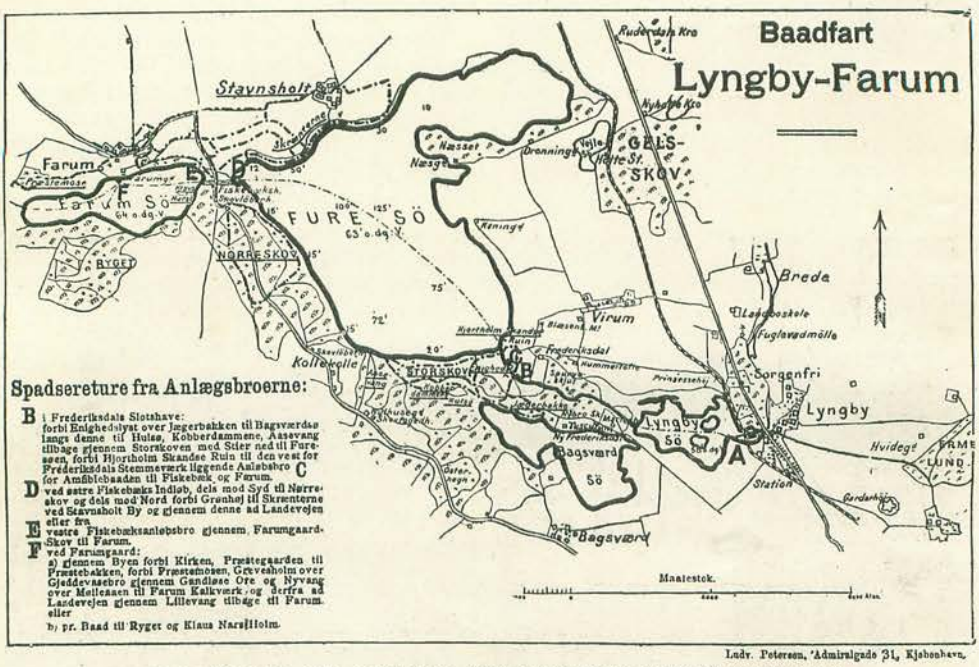
THE "SWAN" COMING OUT OF THE WATER.
From a Photo. by A. Th. Collin, Lyngby, Denmark.

To see her, you must go to Denmark. A half-hour by rail northward from Copenhagen will bring you to a little village named Lyngby, which lies on the edge of one of three beautiful lakes. These are greatly beloved by the Copenhagenites, who use them for recreation, as we use Father Thames. The likeness is even more evident after you have boarded one of the little steam launches which ply from Lyngby to Frederiksdal across Lake Lyngby, for this launch, sometimes with two or three crowded and stocky barges in tow, soon enters a pretty little creek, which winds and twists like the upper reaches of the Thames. The trip to Frederiksdal takes about half an hour, and costs half a kroner—slightly more than sixpence.

The curious little map, which we reproduce on the next page from one of the green handbills distributed by the steamboat company, will show, in a moment, the extent and direction of the trip. Near A is the railway station at Lyngby, and at A is to be found the small steam launch which carries passengers to Frederiksdal. The black line, beginning at Lake Lyngby and extending to B, represents the narrow and winding creek just mentioned. The boat discharges its passengers at B, and, on foot, they cross to C, where the *Swan* lies at a landing-stage, ready for the trip to Farum, which may be seen at F, in the upper left-hand corner of the map. This trip takes about an hour and a half, costs 1s. for the return ticket, and is broken at Fiskebæk (denoted by D) where the railway begins. Before the amphibious boat came into being, the passengers were compelled to alight at this point and cross the Fiskebæk on foot—a short walk, it is true, but one that the passengers rarely relished.

Even now, when the traffic cannot be accommodated by the *Swan*, and barges are called into requisition, to be towed by the *Swan* to Fiskebæk, the passengers in the barges make the trip over the isthmus by means of "Shanks's mare," and launch intermittent execrations at the lucky ones in the *Swan*. But the beauty of the Farum Sö, stretching out in front of the *Swan* as she dips down for the boat is now on her way across Lake Fure—or, as the Danish call it, the Fure Sö—and it will be over an hour before she rides on the railway at Fiskebæk.

The boat, then, is 46ft. long, 9ft. 6in. beam, and draws 3ft. to 3½ft. of water, according to the load. Seventy passengers can be comfortably carried, and, at a pinch, she will take eighty-four. With a full load



MAP OF THE LAKES NEAR COPENHAGEN, SHOWING THE ROUTE TAKEN BY THE "SWAN."
From a Print.

from the rails into water, appeases them, and by the time Farum is reached impatience is forgotten.

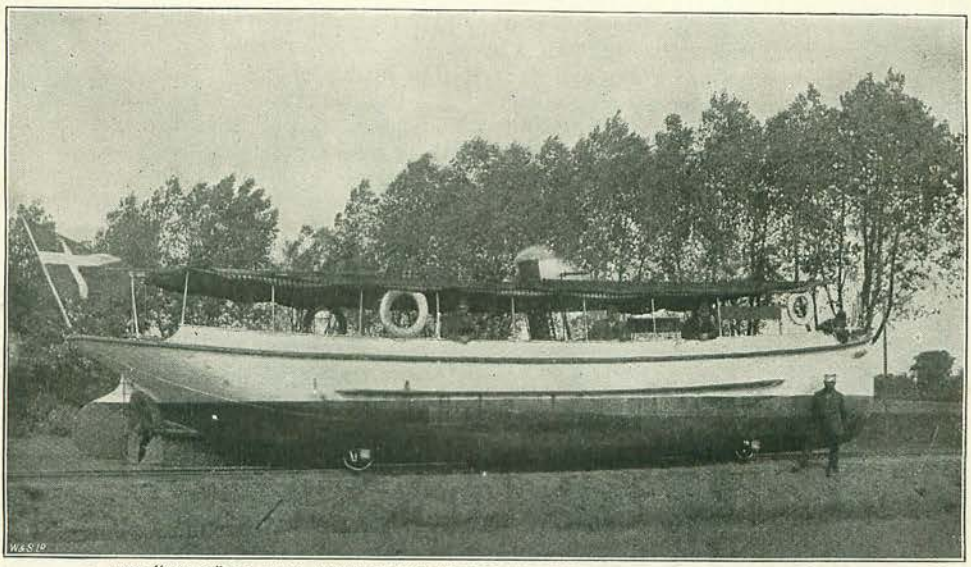
As the amphibious boat lies by the landing-stage at Frederiksdal ready to take her passengers on board, she looks much the same as other boats. If, for a moment, we may call attention to the last illustration in this article, which shows the *Swan* discharging her passengers at Frederiksdal, we may note this similarity, except that the *Swan* is slightly broader, with her lines full fore and aft, in order to allow a framework for the wheels. Wheels? Yes, most certainly, for how else could she go over the rails on the Fiskebæk, out of the water and in again? It is in regard to the double use of wheels and propeller that the *Swan* is unique, and if a little technical language is pardoned, the construction may be easily explained. There is plenty of time to do it, she weighs 15 tons, and when empty 11½ tons. Parallel with the propeller shaft is another shaft, one end of which runs to within 10ft. of the bow, and these two shafts are connected with each other by chain gearing, like the two wheels of a bicycle. The end of the second shaft is connected near the bow by bevel gears, to a little shaft at right angles, and on this shaft are keyed the two little wheels which carry the boat across the rails. Another pair of wheels is to be found at a like distance from the stern, but these are not driven. These are used to keep the boat on the rails, and, with the help of a brake, from going into the water too quickly. The wheels are about 18in. in diameter, and carry two flanges, the bearing surface being a little wider than the rails upon which they run.

So much for heavy description. It is, however, always necessary, although I dare

say that two-thirds of the 40,000 people who have sailed in the *Swan* have thought of little else except the mere fact that they were sailing in a boat on wheels. The interest of the passengers in this "mere fact" is always shown as the *Swan* approaches the end of her trip across the Fure Sö. They crowd to the bow, expecting every moment to see the bow rising out of the water, as if it were a whale that had suddenly decided to come to the surface. But the trick is not done with sky-rocket quickness; instead, the boat gradually nears the shore, where a little dock has been constructed of piles, rammed down into the mud. It is a V-shaped arrangement tapered down until it is only 2in. wider than the boat at its widest part. That is to say, there remains but 1in. on each side of the parallel cleats or fillets which run along the side of the boat.

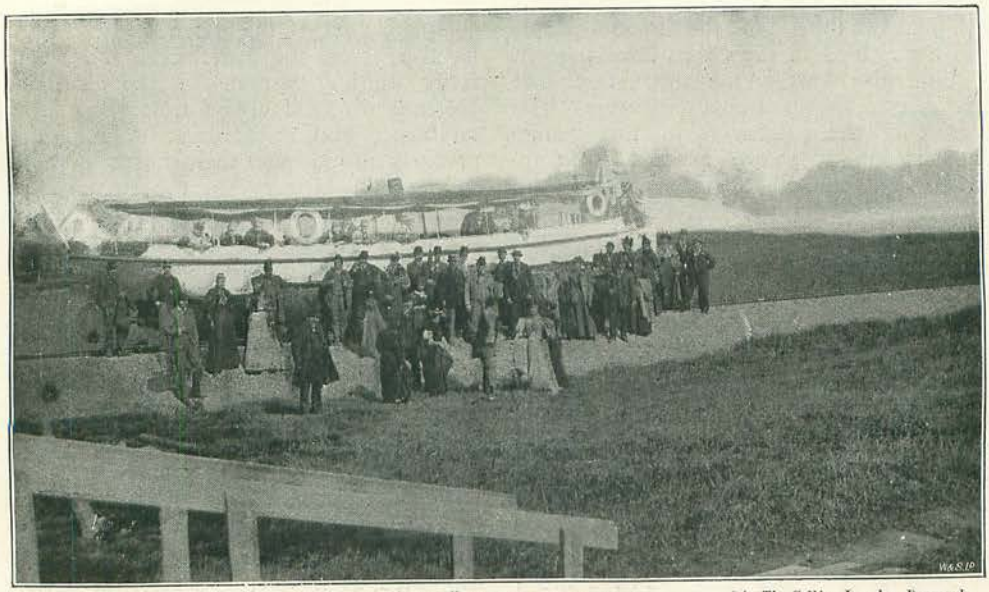
As the boat fits tightly, there is no chance for it to wobble, and passengers are much safer on it than they would be on a 'bus or an electric car. When the narrowest part of this V-shaped dock is reached, the *Swan* enters a small parallel dock of equal width, and moves onward slowly until the front wheels on the keel touch the rails, which, for this purpose, have been extended some distance at a gradient of 1 in 30 below the water. All this time, of course, the propeller has been at work shoving the boat onward, and it keeps throwing out a circular column of beautiful spray until the boat is completely out of the water, and has begun its trip across the Fiskebæk. To see the screw whirling around in the air like a Holland windmill always tickles the crowd on board, who, at the risk of losing their precious noses, put their heads over the stern of the boat to see the circus underneath. The rear wheels find their way naturally to the rails, and the *Swan* rests as steadily and prettily on the land as a real swan rests on water.

The illustration on this page shows the *Swan* resting gracefully on the rails. Most readers will be surprised, as I was, to see such small wheels; but it is the principle of the thing, and not the size of the wheels, which makes the boat interesting. When the boat stops to be photographed, or through any other cause, the curiously-minded turn to this part of the hull with unerring energy, and closely examine it. The wheels are supported, as it were, by a steel frame-work, riveted to the hull, and resembling a patch on the side of a shoe. The faint outlines of this steel patch may be noted in the illustration, as well as fulness of the hull, already mentioned.



THE "SWAN" ON LAND, SHOWING THE WHEELS AND THE RAILWAY ACROSS THE FISKEBÆK.
From a Photo. by A. Th. Collin, Lyngby, Denmark.

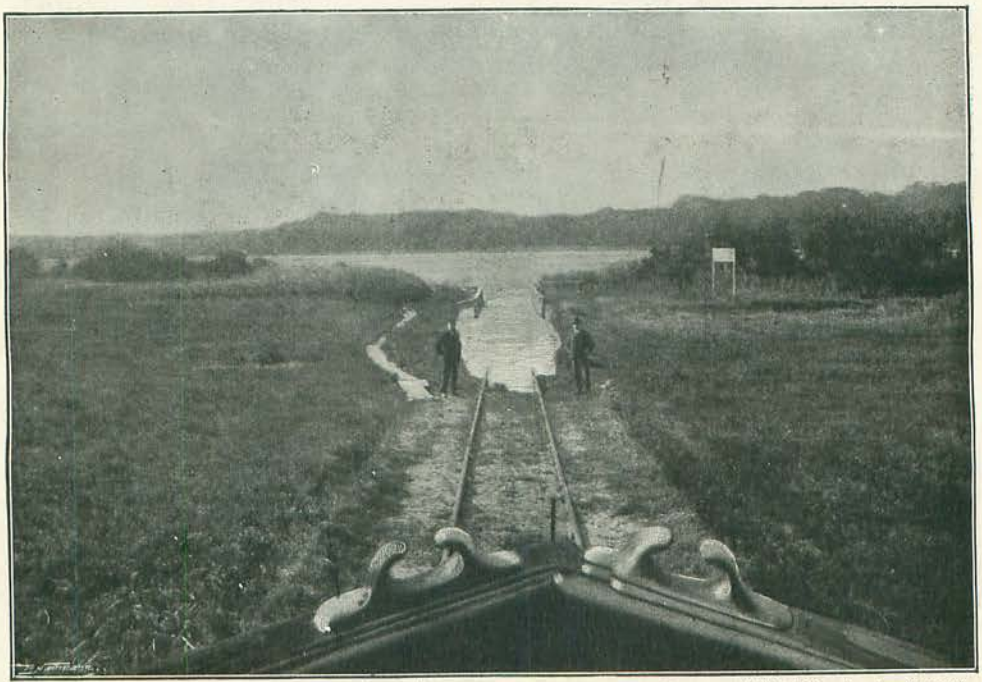
A word or two now about the railway. This was constructed by Herr F. A. Velschow, a noted civil engineer of Copenhagen, and great difficulty has been experienced with it on account of the soft, peaty ground. Yet no accidents have taken place, and the boat has made its half-dozen



From a Photo. by] THE "SWAN" AND ITS PASSENGERS. *[A. Th. Collin, Lyngby, Denmark.*

return trips daily with great success. The isthmus, over which the rails are laid, is between 800ft. and 900ft. in width, and the boat crosses in three to four minutes, going a little faster than a man's walk. Two hand levers control the boat while on this land journey, the one to put in motion the wheel shaft, by means of a common shifting clutch, and the other to press the brake on the back wheels.

The history of the *Swan* is rather interesting. Designed by a Swede named Magnell, and constructed by Ljunggreen, of Christiansbad, in Sweden, the boat was intended for use in Boras, a little town of 10,000 people, where a narrow bit of land separating two



From a Photo. by THE "SWAN" DESCENDING INTO THE WATER. *A. Th. Collin, Lyngby, Denmark.*

Baadfart Lyngby-Farum

Fartplan.

Hverdage:

Lyngby til Frederiksdal . . . . . Kl 7, 10¹⁵, 11⁴⁰, 12¹⁰, 3¹⁰, 4⁰⁵, 5¹⁵. 7, 8,
Frederiksdal via Fiskebæk til Farum — 10⁴⁵, 1³⁰, 4³⁰,
Farum via Fiskebæk til Frederiksdal — 12³⁰, 3³⁰, 6³⁰,
Frederiksdal til Lyngby. . . . . — 7³⁰, 10⁴⁵, 12²⁰, 2⁴⁰, 3³⁵, 5, ∪, 7³⁰, 8³⁰,

Sondage

afgaa desuden hyppigt extra Baade med særligt Hensyn til Togtiderne paa Nordbanen.

Ved at afgaa fra **Nordbanestationen** f. E. Kl. 9³⁷, 11⁵⁸ eller 3³⁷ vil man kunne være tilbage i **Kjøbenhavn** Kl. **4, 6** og **9** for en samlet Bane- og Dampbaadstakst af **Kr. 1,10** til Frederiksdal og **Kr. 2,30** til Farum pr. Amfibiebaaden.

Takster.

Fra Lyngby til Frederiksdal . . . . Tur **30** Øre. Tur & Retour **50** Øre.
- Frederiksdal til Fiskebæk . . . — **50** — — **80** —
- Fiskebæk til Farum . . . . . — **25** — — **40** —
- Frederiksdal til Farum. . . . . — **60** — — **1,00** —

Børn og Cycler det Halve.

Banetog afgaa fra Kjøbenhavn Kl. 6⁵⁵, 7⁵⁰, 9³⁷, 11⁰³, 11⁵⁸, 2³⁷, 3³⁷, 4³⁸, 5³⁷, 6²³, 8²⁵, 9⁵⁷, 11²⁵.
— — - Lyngby - 7, 8¹⁰, 9⁰⁹, 9⁴⁸, 10⁴⁶, 12¹⁰, 1³⁴, 3¹⁹, 6, 7²⁷, 8³⁴, 9²⁵, 10⁵⁹.
Søndage: Extratog fra Kjøbenhavn Kl. 9¹⁰, 11⁵⁰. Fra Lyngby Kl. 8⁰⁶.

Selskaber paa over 25 Personer gaa om Hverdagene til **halv Pris,** naar de bestille Pladser Dagen forud. Abonnementsbilletter, Maaneds- og Saisonkort til modererede Taxter, faaes ved Henvendelse til

„Dampbaadskontoret" i Lyngby
Telefon Lyngby 52.
Dansk Touristforening
Ny Østergade 7.
eller **Cook's Reisebureau,** Ny Havn 49.

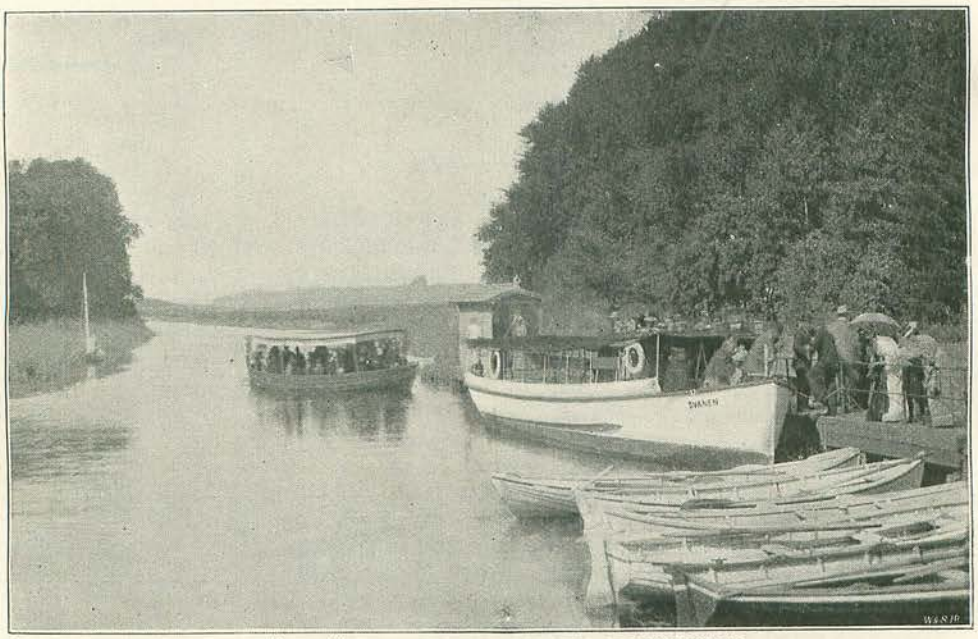
TIME-TABLE OF THE LYNGBY-FARUM STEAMBOAT COMPANY.
From a Print.

bodies of water, and occupied by a water-mill, had to be crossed on foot. While the *Swan* was being constructed, however, a railway stepped in, built a line in direct competition with the little steamboat company, and effectually ruined the boat traffic. There was now no need for the *Swan*, and she was bought up by the Copenhagen people for 11,000 kroner—over £550—and brought by steam ferry to Elsinore, whence she was carried by rail to Lyngby. It was a remarkably successful investment, for the fame of the "amfibiebaaden" spread through Denmark with great celerity, and the managers found it almost impossible to cope with the traffic.

The idea of taking a boat across land on wheels is not new, although the Scandinavians are the first to put the idea into practice. Several years ago, Captain J. B. Eads, one of the best-known American engineers, proposed a plan for a ship-railway across Tehuantepec, in Central America, but the plan was never realized. Perhaps the seeming difficulties in the way discouraged other inventors. At all events, when the amphibious boat was first talked about the old sea-dogs shook their heads, refusing to believe in the possibility of the enterprise, and describing it as imaginary and of no practical utility. The world, however, moves.

Those who know Danish will have a happy half-hour reading the accompanying time-table; but for those who can make neither head nor tail of it, we extract the salient points. On week-days, the boat makes three trips each way, and on Sundays it runs uninterruptedly in order to accommodate the Sunday pleasure-seekers. Whole families—this, of course, is not in the time-table—start

from Copenhagen for the day, take the trip on the lakes, spend two or three hours on the shore of Farum, or at other points, and, returning by the boat, take the eleven o'clock train back to Copenhagen. Cycles and children are carried for half-price, and the prices for single and return tickets to each of the various stopping places on the lakes are given under the heading "Takster." Information is also given to the effect that parties of over twenty-five persons are taken at half-price, providing notice is given beforehand—an offer that will



THE "SWAN" DISCHARGING HER PASSENGERS AT FREDERIKSDAL.
From a Photo. by A. Th. Collin, Lyngby, Denmark.

probably be snapped up by our readers when the *Swan* again goes into commission. With the 1st of October her trips for this year were over, and she will not run again till next June or July.

The descent of the boat into the water is not less effective than the ascent. It is much like tobogganing, except that the *Swan* goes slowly and surely, being retarded at the right moments by the brakes on the hind wheels. In a few seconds the bow touches the water—it dips deeper and deeper as it runs along the rails extended into the lake, and then launches itself with a little splash.

Our last photograph shows the *Swan* discharging her passengers at Frederiksdal, the ticket-collector standing near the bow, and the well-filled barge, which has been towed across the lake, coming up to the landing stage. The stream in which the boats lie joins the Fure Sö, near the small hill in the distance.

A word might be added as to the future of amphibious boats. It is evident that for passenger and cargo traffic on rivers with rapids, such boats would be of great advantage. The British Colonies and the United States are full of such rivers, and great expense is incurred by the unloading and reloading of cargoes. Passengers, moreover, object strongly to shift from one boat to another. The solution of the difficulty is a boat on the lines of the *Swan* and the construction of a railway. The expense is not heavy, and the venture would quickly pay for itself, as has been the case in Denmark, by additional passenger traffic attracted by something new.