The Graphic Laboratory of Popular Science

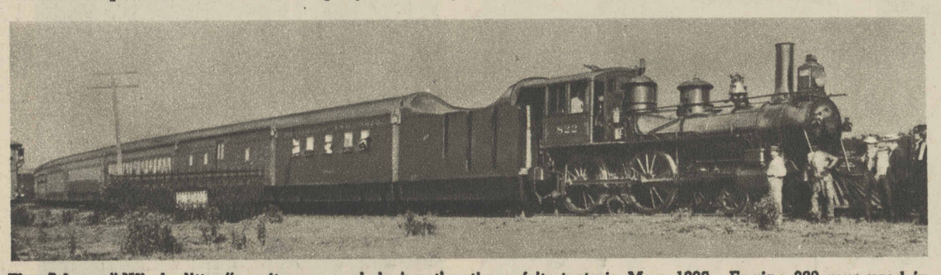
By Dr. Michael Ference

The new Broadway Limited

The Story of Streamlining—Railroading's New Saga

IT IS WITH considerable interest and pride that the recent announcement is received of the streamlining of the crack Broadway Limited and the new Twentieth Century. For this closes the first phase of The Tribune's campaign to modernize and speed up America's railroads.

The Chicago Tribune has followed the practice of printing in its daily and Sunday issues pictures of experimental trains on both American and European railways that are likely to become accomplished fact, and of supplementing these pictures with pointed editorials and feature stories on streamlining.



The Adams "Windsplitter" as it appeared during the time of its tests in May, 1900. Engine 822 was used in the first test. (Photo courtesy of A. B. Adams.)

Particularly vigorous in his constructive criticisms of railroads was the late Harry A. Laird, trafic manager of The Tribune. We quote from an editorial printed in 1933:

"Aerodynamics dictated the design of the freakish trains that are being exhibited today, but they will become the standard trains of tomorrow, because, with weight cut in half and wind resistance reduced to a minimum, operating costs will be proportionately reduced. Not only will they be able to attain greater speeds than are possible with present-day equipment, but they will be able to start and stop with a minimum reduction in average velocity. Overnight transportation from Chicago to New York and service from Chicago to the Pacific coast with the loss of a single business day are possibilities, at a greatly lowered cost. Add soundproofing and air conditioning and the airplane will have a rejuvenated competitor."

Early locomotive engineers shunned novel designs that might be construed as freakish. The early locomotives had upright boilers, a vestige inherited from the stationary engine, because the locomotives were really nothing else than donkey engines adapted to locomotion. Observers of that day were shocked with the first horizontal boiler and termed it freakish.

• • •

Because of the appalling death toll of the early wooden coaches, railway engineers, in search of a car that would not telescope, at first adopted the steel frame and finally the all-steel car, but in doing so enormously increased the weight of the coach. To furnish power to preserve speeds with the increased train weight it became necessary to increase the weight and size of the locomotive until the standard train of just yesterday weighed in excess of 900 tons.

As recently as ten years ago the mere suggestion of a light cylindrical railway car would have been met with derision, because all coach building efforts of the last century were directed toward producing a portable hotel or a home on wheels. If such an express train carries eighty passengers, simple arithmetic will show that twelve tons of metal is being transported for each passenger, and it is small wonder that passenger fares are high when it is considered that a box car weighing 23 tons, with an average load of freight weighing twenty-seven tons, requires no more motive power than to transport four passengers!

Again, locomotive engineers had given little consideration to any factor of resistance other than inertia. As air brakes, running water, electric lights, and superheating were adopted, their clumsy equipment was fastened beneath the cars or on the locomotive. In 1900 Chief of Motive Power Adams of the Baltimore and Ohio, formerly a Tribune reporter, conceived the idea that these obstructions were materially retarding his trains. He figured that if air resistance were even partially removed he could halve his power expense.

An Adams train (illustrated) involving ideas surprisingly like the streamlining of 1938 was constructed and operated for four months between Washington, D. C., and Baltimore, Md. The sides of the car were slotted, the wheels were shrouded, and all obstructions smoothed out or removed. Although the train showed some improvement in speed, as a whole it did not prove to be an overwhelming success. What Mr. Adams apparently did not know was that at speeds of around fifty miles an hour, the average of the Baltimore-Washington run at the time, wind resistance is only commencing to be a factor.

• • •

With train speeds up to ninety miles an hour, air resistance has become a vital factor in designing, and railway engineers are taking their cues from the airplane designers, whose chief problem is air resistance. The results of ultramodern streamlining are embodied in the new Twentieth Century and the Broadway Limited. These trains leave Manhattan and reach Chicago in sixteen hours.

In their alluring designs these trains combine great beauty and utility with a welded, streamlined construction, being among the most modern, distinctive, and luxurious trains ever built for railway service. With rounded roofs, flush windows, skirted sides, vestibule closures between cars, and disappearing, roll type steps, each train presents a notable appearance of streamlined unity. These cars, made of the versatile high-tensile steel, weigh about two-thirds as much as the old standard.

Mostly About Dogs

By BOB BECKER

Open Forum for Owners of Dogs

(Tribune photo.)

Heidi, a nine-month-old dachshund, with his 7-year-old playmate, Gretchen Rahn. The dachshund has been gaining in popularity in America.

TO DOG owners the problems of the health of their pets, bad habits, training, grooming, feeding, and other subjects seem sometimes to be legion. Here are some fairly typical questions (with answers) which appear in our mail from owners of both puppies and grown dogs. Judging by the inquiries about shows, many owners are becoming more interested in going into that fascinating game, which is exciting—unless you are a bad loser!

Q.—Does it cost a lot of money to show a dog in a dog show?

A.—No. The big cost is in breeding or buying a dog that is good enough to win. You pay about $3 to enter your dog in a show (one class). If you use a professional handler his fee will run around $10 or $15 for the show, depending on how much time he gives to the dog. If you want the handler to train the dog to walk well on a leash and pose in the ring, naturally his charge is more.

The Shetland sheep dog is a breed not often seen in American homes. It is virtually a collie in miniature. The dogs pictures are Wrain and Willoughby, three months old. (Tribune photo.)

Q.—I have heard that prepared dog foods cause skin trouble. Is this true?

A.—It is not true of honestly made, sensibly priced dog foods that contain nourishing, wholesome ingredients, including vitamins. We feed our dogs such prepared foods, and none ever has had skin trouble due to diet. But (as pointed out in this column some time ago) cheap, poorly made dog foods, turned out to meet a price instead of being manufactured with the quality and health factors in mind, may cause trouble for your dog, because they are not balanced, nourishing foods.

Q.—Is it wrong to feed a dog more than once a day?

A.—No. Puppies may be fed four or five times a day. Some grown dogs do better on a light meal in the morning (maybe a biscuit or two) and then a heavy meal in the evening. In hot weather it's a good idea to feed your dog late in the day, when it begins to get cooler.

Q.—What were the five leading breeds in the American Kennel club registrations last year?

A.—They were as follows: Cocker spaniel, Boston terrier, Scottish terrier, fox terrier (including both smooth and wire), and the beagle.

Q.—Which is correct, Scotch collie or collie?

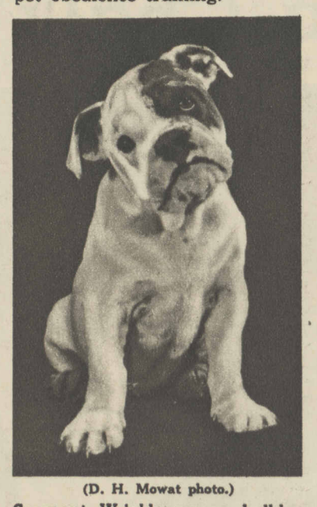
A.—Collie is the correct and official name of the breed.

Q.—How often should a dog's teeth be cleaned?

A.—It depends on the health of the dog, his diet, and other factors. The surest way to tell when this work must be done is to examine the animal's teeth. If they are discolored or encrusted with tartar it's time to have them treated. We advise an examination by a veterinarian from time to time. Old dogs may have to have some teeth extracted.

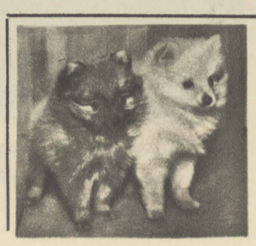
Q.—Is obedience training of a dog hard on the animal? Do trainers use much force to teach dogs obedience?

A.—The answer is no to both questions. Dogs usually enjoy being taught to do things. Good dog trainers are not Simon Legrees with a whip in each hand. They teach by repetition, patience, and understanding of each dog's characteristics, and they use just enough firmness to get the dog to respect its master's wishes and commands. We urge every dog owner to give his pet obedience training.



(D. H. Mowat photo.)

Sergeant Wrinklepuss, a bulldog puppy three months old. Wrinklepuss was sired by Hefty Son o' Dan.



• For attractive offers of dogs, turn to the Dogs, Cats, Birds, and Poultry columns in the want ad section of today's Tribune.

Feathering Airplane Propellers

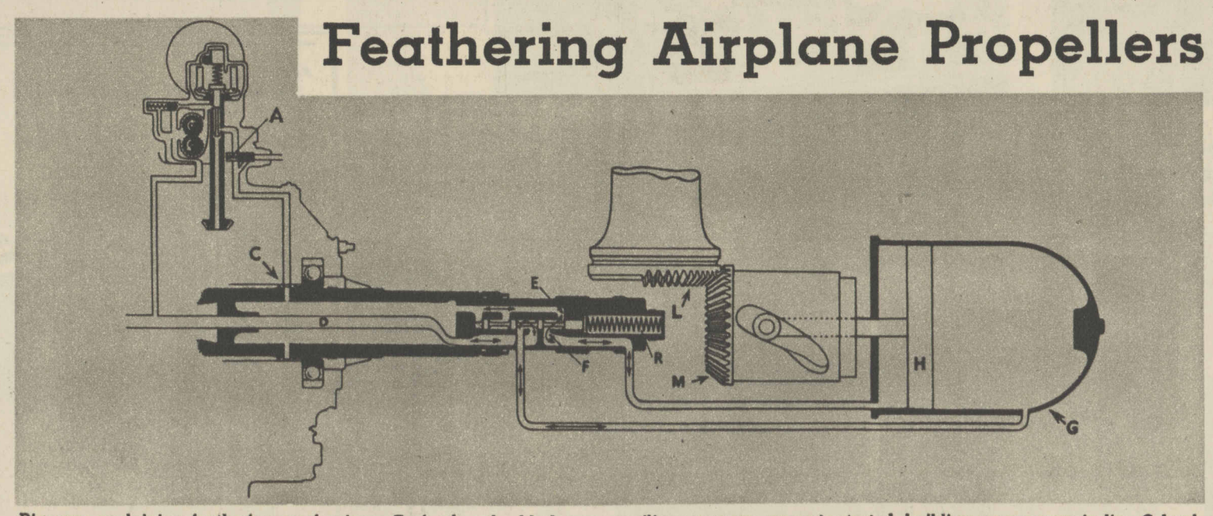


Diagram explaining feathering mechanism. To feather the blades an auxiliary pressure pump is started, building up pressure in line O leading to constant-speed governor and disconnecting the governor. Spring A is compressed, allowing the pressure to be transmitted past C and ports E and F to the inboard side of piston H. The piston moves out under the pressure, forcing oil in the dome G to flow back to the engine lubricating system. As the piston moves the blades move to a higher pitch. For unfeathering the process is reversed by selector valves.

By WAYNE THOMIS

AN AIRPLANE propeller is said to be feathered when the faces of its blades are adjusted so that they no longer are broadside to the air stream, but are turned to present knife edges to it. In this position they offer virtually no resistance and air forces on each side of the blades are equal, so that their rotation is stopped.

Feathering propellers are not important for single-engined aircraft. They are, however, for multi-engined machines. By feathering the propeller of a dead engine a pilot may be able to carry on to safety or to his destination on the remaining live engine of engines. Stopping blades of a dead engine halts destructive churning of parts inside the motor that have failed and also brings to an end vibration that may be set up by a windmilling motor.

The fatal crash at Cleveland recently might have been averted if the plane had been equipped with full-feathering propellers. The right engine failed, and oil leaking out of a cylinder caught fire in the engine nacelle. The windmilling prop continued to pump more oil out of the motor, even though the switches were cut, feeding the fire. A feathering propeller would have halted the oil flow.

That the airlines are aware of the benefits of this type of propeller is shown by orders to equip the entire fleets of Douglas DC-3 airliners for both American Airlines and United Air Lines as rapidly as possible. This type of propeller will be standard for new military planes and for the Douglas DC-4, Boeing 307 airliner, and the new Boeing Clipper.

The Curtiss full-feathering propeller is electrically operated. A tiny motor, highly geared, in the hub itself sets in motion the blades. They may be completely reversed if it is desired. This propeller requires a slightly longer interval than the Hamilton to reach full-feathering position.

Both these types are constant-speed propellers, or can be operated like constant-speed controllable-pitch propellers when not fully feathered. The Curtiss has the widest pitch range, but the new Hamilton is generally considered entirely adequate for all except the most violent and extreme demands by military planes.