

Airplanes Conquering Fog—Continued

trate. Similar lights have been suggested, and actually tried, for use in harbors as guides to ships through fog. The case is different from that of the airplane, however. When the ship is a mile away from such a light, it would have to be seen through a mile of fog, a thing quite impossible even with neon. But fog usually sticks close to the surface of the earth or water, and a few hundred feet up, the air would be comparatively clear. Thus, the pilot of a plane a mile over the field may only have to look through a few hundred feet of fog, and this is quite possible. By having such a light at each corner of the landing field, the pilot can dive down into the fog and make a good landing, even though he can barely see the field until he is almost on the ground.

Another electrical device for guiding airplanes, and that has come into wide use, is the earth inductor compass, also a development of the Bureau of Standards. With the ordinary compass, the electrical connections of the engine, as well as its steel parts, attract the needle. Also the vibration and constant swinging of the plane causes other tremblings of the needle, so it is very uncertain at best. The influence of the magnetism of the engine can be greatly reduced if the compass were placed perhaps ten or twenty feet away from it—in the tail, for instance. But then the difficulty is that the pilot can't see it. There is no way of arranging the ordinary form of compass to read at a distance.

So there was developed the earth inductor compass. It depends on the same principle that make it possible to turn a dynamo with a steam engine and get electricity out of it. That is, if you spin a coil of wire inside a magnetic field, it produces a current. In the dynamo the coil is spun by the steam engine, or whatever is used for power. The magnetic field is provided by electromagnets, called the field magnets, which are energized by the dynamo's own current. Since there must be current to cause the magnetism, and also cause the current, it is necessary to send a current from a battery, or other dynamo, through the field magnets when it is started.

But the earth inductor compass makes use of a magnetic field that is always with us, the same magnetic field that pulls the compass needle

toward the north. This is the magnetism of the earth itself. Though this magnetism is rather weak, compared with that of a dynamo, it is possible to spin a coil of wire in it, and to get a current from it. In the compass there are four coils. These are spun by a little windmill device that sticks up from the plane and takes advantage of the rush of air as the plane is in flight. As the coils spin, they come into contact with two brushes, that take off the current they generate.

To produce a current, the wires in the coil must cut across the lines of force of the magnetic field. A line of force is simply the direction in which a freely suspended compass needle will point. Therefore, if the brushes are east and west of the coils, there will be no current. As the coils come into contact with the brushes, they are themselves traveling north or south, and parallel to the magnetic field of the earth. Imagine that the plane is flying east, with the brushes east and west. As long as the pilot continues in the same direction there will be no current, and the needle of an ammeter on the instrument board will remain in the center and read zero. But then the plane turns a little to the north. The spinning coils now touch the brushes while they are crossing the lines of magnetic force, and there is a current. Immediately the needle swings to the north, or right, side of the plane, to inform the pilot that he is deviating to that side, so that he can immediately correct his route.

If he does not happen to be going east or west, the position of the brushes can be changed by means of a switch located just below the indicator. So all the pilot has to do is to set this to the direction in which he wants to travel, and then to fly so that the needle stays in the center. With this compass to give him his direction, with the radio beacon to tell him the course, with the radio telephone to tell him of weather and landing conditions along his route, and with the neon lights to mark the field in all kinds of weather, flying is rapidly becoming as safe as rail-roading.

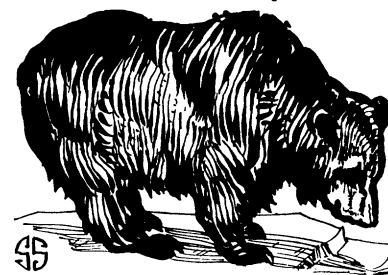
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The Leviathan recently set a new speed record for ocean liners by going 27.8 knots an hour which is 36.4 land miles.

NATURE RAMBLINGS

BY FRANK THONE

Natural History



Grizzly

"The grim, taciturn bear, the anchorite monk of the desert."

So Longfellow, in "Evangeline," termed the grizzly bear. And it was a good natural history note, too. Unlike the rather neighborly, really somewhat friendly black bear, the grizzly is a shy, aloof, gruff fellow, who wants no companionship, not even that of his own truculent species. When he comes upon a find of food in the wild, whoever else may be there stands not upon the order of his going, but goes at once. Else, sledgehammer cuffs and baerserk clawings.

The grizzly is distinguished from the black-bear group not only by his much greater size and his iron-gray, sometimes silver-gray, fur, but by a noticeable difference in form. The black bear's shoulders are not appreciably higher than his hind-quarters, but the grizzly always has a pronounced hump. His body builds up to a powerful pyramid of muscle where his neck and forelimbs join on his back—a monument to the deserved dread in which he stands among the other folk of the North American wilderness.

Once numerous throughout the West, the grizzly has now been pushed nearly to extinction. Only a few hundred specimens survive, and these are mostly protected "show" bears in national parks and forests. The largest single group is probably that in Yellowstone National Park.

In spite of his morose disposition, however, the grizzly seldom troubles human beings, and there is scarcely a clear case on recent record of his having taken the aggressive unprovoked. At the Yellowstone "bear-dumps" there are always rangers on guard with high-power rifles, but to date they have never had to fire them in defense of tourist spectators. The bears are content to feed and go their unfriendly way.

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