

## Icebergs

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crease in numbers noticeably after the middle of June, and from the middle of July on until the following spring the area south of the Grand Banks is practically free from them. An isolated berg or two may drift down to the Tail, the southern tip of the Grand Banks, but not often south of it, as late as October. After that month it is unusual to sight bergs in the latitude of the Grand Banks until the following February.

"The manner and rate of disintegrations of bergs in the mixed waters around the Tail of the Grand Banks is interesting. A berg melts most rapidly just below the water line, and when south of the Grand Banks more rapidly below the surface of the water than above. A berg which drifts south along the east side of the Grand Banks, except late in the season, is surrounded by water of a temperature lower than 35 degrees Fahrenheit until after it passes the Tail. Disintegration under such conditions is rather slow, but in the mixed water and in the Gulf Stream south of the Grand Banks it is accelerated.

"Disintegration is also accelerated by high waves and heavy swell, the effects of which are noticeable on bergs which drift wide offshore in the Atlantic in early season.

"A berg of average size in the mixed waters south of the Tail of the Grand Banks will survive as a menace to navigation for a period of 12 to 14 days during April, May and June, but will not survive longer than 10 to 12 days thereafter. A medium-sized berg farther south within the confines of the Gulf Stream will survive approximately 7 days. This figure, however, may be open to wide variation, as witnessed by the Ice Patrol in June, 1926, when a huge berg 382 feet in length, floating in the northern edge of the Gulf Stream south of Newfoundland, completely melted away in 36 hours. On the other hand, during this same year and month there is an authentic report of a piece of ice, 30 feet in length, 15 feet in width, and showing 3 feet out of water, which was sighted not far from the tropical island of Bermuda.

"The Arctic ice menace looms very large in some years while in others it has sometimes been barely traceable. As an example of the great annual variations to which it is subject, the records show that in 1912 there were approximately 1,200 icebergs that

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## ENTOMOLOGY

## Fight Tsetse Fly

Voluntary organization of African natives in a war against the insect which is holding back the development of the continent of Africa, is the feat reported by C. F. M. Swynnerton, British entomologist, in a recent lecture in Washington.

The tsetse fly, carrier of two forms of sleeping sickness and of a disease fatal to domestic animals, is the root problem to be faced by the countries holding African mandates. It must be satisfactorily settled, Mr. Swynnerton said, before the potential value of Africa as a source of raw materials, a market for manufactured goods, and a refuge of surplus populations, can be realized. It has already invaded large areas of the continent and is spreading rapidly.

The tsetse fly, a relative of the house fly, prevents the keeping of cattle in infested areas. This one effect of its presence is sufficient to hamper seriously any attempt at developing the country, Mr. Swynnerton said. It is even held responsible for immorality of the natives. In Africa cattle are dowry. Without cattle there can be no dowry, hence no marriage.

Mr. Swynnerton has for some time been experimenting in Tanganyika territory with methods of fly control, and has succeeded in arousing the enthusiasm of the natives and in teaching them to help themselves. The dependence of the tsetse upon sheltering woody growth has been Mr. Swynnerton's point of attack. He has showed the natives the necessity of cooperative grass fires over a large extent of country at the end of the dry season. These fires will clear great areas of the tsetse. Those remaining will congregate in grasslike thickets which have not been burned through and can be caught before they disperse.

The advance of the bush means advancing infestation and is the cause of sudden depopulation of formerly uninfested areas. Instead of retreating before the onslaught of the tsetse, Mr. Swynnerton has shown the natives how to take the bull by the horns and keep down the bush by cutting. The response has been hearty. Natives have organized by thousands as if for war, and under his leadership, have saved their lands by exterminating the advancing bush.

Another important part of Mr. Swynnerton's policy is to encourage

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## ASTRONOMY

## Nebulae Stages In Evolution

The spiral nebulae in the sky, recently shown by an American astronomer, Dr. Edwin Hubble, of the Mt. Wilson Observatory, to be systems of stars like the one of which the sun and other visible stars and the Milky Way are parts, show an almost continuous series of stages in the evolution of stars. This is the opinion of Dr. J. H. Jeans, leading British astronomer, expressed in the scientific magazine *Nature*.

Commenting on a recent paper of Dr. Hubble's, Dr. Jeans states that "he paints a most fascinating picture of the system formed by the great nebulae, and frames it in such convincing observational evidence that it would be difficult to reject it.

"As seen in a telescope, the great nebulae differ widely in shape, size and brightness. But Dr. Hubble brings a mass of evidence to prove that differences in size and brightness between nebulae of the same shape are almost entirely due to a distance effect. If all the nebulae were put in a row at the same distance from us, it would at once be seen that nebulae of the same shape all had approximately the same dimensions and luminosity, while even nebulae of different shapes would exhibit only comparatively small ranges of dimensions and luminosity, especially the latter."

As a result it is possible to estimate the distances of all the nebulae, even the very faintest that can be seen with a powerful telescope. The faintest that can be observed with the great 100-inch telescope at Mt. Wilson, the world's largest, prove to be so distant that light takes 140,000,000 years to reach us from them, traveling about six trillion miles a year. Some two million nebulae lie within this distance, at an average distance of about 1,800,000 light years apart.

Dr. Jeans suggests a model of this vast horde of galaxies. "Take 20 tons of walnuts," he says, "and space them at about 25 yards apart, thus filling a sphere of about a mile radius. This sphere is the range of vision of the 100-inch telescope; each walnut is a nebula containing matter enough for the creation of perhaps a thousand million suns like ours; each atom in each walnut is a solar system with a diameter equal to that of the earth's orbit."

It is almost certain, says Dr. Jeans, that the various forms of

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### Nebulae

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nebulae represent different stages in evolution, and, incidentally, agree with the sequence which he suggested in 1917 on theoretical grounds. Starting out with a sphere of gas, it changes to an onion-shaped mass, which mathematicians call an oblate spheroid, and then to a lens-shaped figure. Then the gas streams out into two arms where it condenses into many smaller masses which eventually become stars. Finally the whole cloud of gas has been transformed into a cloud of stars.

As these nebulae are approximately equally spaced as far as we can see into the heavens, Dr. Jeans suggests that the nebulae themselves are the result of the condensation of a still earlier cloud of gas hundreds of millions of light years in diameter and extremely tenuous. Such a gas would have had a density expressed as a fraction of that of ordinary air by the figure one over a one followed by 31 ciphers. This scheme, he points out, fits in with the law of gravitation, the known properties of gases, and survives the test of numerical computation.

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### Tsetse Fly

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the natives to settle close together. This system of living is in itself a safeguard against the tsetse. By congregating, the population is sufficient to keep down the bush for natural uses such as firewood, building and agriculture.

"Africa can never be developed adequately while the tsetse remains in possession," Mr. Swynnerton said. "I have shown that the case is by no means hopeless. What we now want are men who, trained at the stations where work is already proceeding, will go thence to new areas, study conditions and right combinations of measures for each and extend the campaign throughout the tsetse-ridden half of Africa."

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A wheel that makes almost 700 revolutions a second was used on the airplane in which Lieut. John Macready made his recent altitude test flight.

Students of the University of Rio de Janeiro have petitioned that standard German medical books be translated into Esperanto, so that they may be read more easily.

### Icebergs

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drifted south into the Atlantic, while in 1924 there were only 11."

The sailor of story books who could "feel" the presence of icebergs long before they were sighted seems to be a figment of the imagination of some fiction writer, for there is ordinarily no appreciable cooling of the air near a berg, says Lieut. Com. Smith. Nor does a sudden cooling of the water necessarily mean the presence of one, for the water temperature does not change appreciably in their proximity either. However, when a ship passes out of the warmer water south of the Grand Banks and into the colder region where the Arctic waters mix with the tropical currents, the water temperature may in winter drop as much as from 54 to 32 degrees Fahrenheit in a ship's length. When this happens, the navigator knows that he is in a region of possible iceberg danger.

Small forms of aquatic life, called plankton, are so numerous in these Arctic waters that the ocean sometimes takes on a green color and has a fishy smell, but these do not necessarily indicate the presence of an iceberg either. Birds sometimes roost on the bergs, but they are often seen far from any ice. The common ideas of seals disporting themselves on icebergs are also wrong, says Lieut. Com. Smith, for a seal would be unable to climb on a berg.

Rapidly vibrating sound waves, emitted from under-water apparatus, may be used to indicate the presence of the dangerous ice when the waves are reflected back to the ship, but this method is still in the experimental stage. The best way of locating them is by a lookout, preferably located in a crow's nest on a mast. From such a point of vantage they can be sighted 12 to 15 miles away, and they have been sighted when as distant as 20 miles, while the man on the bridge cannot see them farther than about 10 or 12 miles. In a dense fog, they may not be seen until within a hundred yards, though on a dark, starlight night they may be seen when as much as a fourth of a mile distant. On a moonlight night, they can be seen as far as 8 miles, and are conspicuous at 5 miles, while on a clear moonless night, with the aid of a searchlight, they may be located when 2 miles away.

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A reinforced concrete chimney 400 feet high, said to be the tallest of its kind in America, was recently built at Trail, B. C.

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