



Ants

► THE next time an ant takes a short cut across your picnic cloth, it may put matters into perspective to reflect that ants were here before we were. Long before.

On the evidence of ant fossils preserved in amber, it is known that at least thirty million years ago ants were living together just as they are today, in large communities, with a caste system, with division of labor. Man is a mere Johnny-come-lately, with a scant million years behind him.

Ants are prodigious athletes in proportion to their size. They can lift a weight 400 times their own weight. Theoretically a five-pound ant could easily lift a ton. Luckily five-pound ants are unknown.

Despite their small bulk, ants display a great range of size from the smallest ant to the largest, even within the same species. The largest ant of a species may weigh several thousand times more than the smallest. Among humans, even considering obese giants at one extreme and dwarfs at the other, the factor does not exceed 30 times.

Ant colonies consist of not just two, but three sexes: males, females, and neuters. The neuters, who are the workers, are anatomically female, but sterile. The so-called queen is a sexually mature female. There may be several such fertile females in an ant colony.

The workers are wingless. Only the males and females have wings, which are used but once, during the nuptial flight. Shortly before swarming time, males and females will be produced in great numbers. The colony is a bustle of activity. The workers keep the adults in check until the weather is propitious. Warm windless days seem to be preferred, because when such a day comes, from all ant colonies in the neighborhood clouds of males and females will swarm skyward in the nuptial flight.

Males and females pair off in what is destined to be the first and last youthful fling for both of them. The female will immediately burrow herself a home in the earth or move in on an established colony. In any case, she will keep the sperm she

received on her nuptial flight in a special pouch in her body, and will use them to fertilize all the eggs she will produce for the rest of her life. The bridegroom, having fulfilled his biological destiny, wanders off, loveless, homeless, and alone, doomed to an early death.

If it is warm and airless the day of your picnic, take a close look at the ant before you flick him off into the tall grass. If he has wings, he is probably a bridegroom, perhaps dazed at the breath-taking brevity of his honeymoon. If he has wings, treat him gently, for his hours are numbered.

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ENGINEERING

Motor Stops and Starts In Four Milliseconds

► A SMALL electric motor at the National Bureau of Standards in Washington can be stopped and started again in the reverse direction in four-thousandths of a second. The device is used primarily for employment in the "giant brain" electronic computing machine but it may have many other applications.

It is relatively easy to stop a motor rapidly with brakes, but rapid starts either in the same direction or in reverse are limited if electromagnetic means alone are used. In the Bureau's new rapid-reversal motor, the energy of the rotor which would be dissipated as heat during braking is stored in a spring for use in restarting.

In the experimental work at the Bureau, a small two-phase motor operating at 3,200 revolutions per minute was used. The reversal spring consists of a steel torsion bar 31 inches long and less than a half inch in diameter. Only one phase of the motor is connected to the alternating-current power supply; thus the motor will rotate in the starting direction.

The motor shaft is rigidly connected to one end of the torsion bar, which is equipped at the other end with two positive unidirectional clutches. One clutch prevents clockwise rotation and the other rotation in the opposite direction. If the motor is rotating in a clockwise direction and the proper clutch is engaged, torsion brings the rotor to a stop in approximately 20 degrees. The energy stored in the torsion bar is then returned to the rotor to cause a counterclockwise impulse. Full speed in reverse is obtained in two milliseconds.

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METEOROLOGY

Summer Arrives Ahead Of Schedule This Year

► SUMMER will be ahead of schedule this year, the U. S. Weather Bureau's 30-day extended forecast shows.

Temperatures averaging warmer than seasonal normals were predicted for the next four weeks—from mid-May to mid-

June—over most of the country.

Only region where cool weather may persist is in the northern Rocky Mountain states and the Dakotas. Even there, however, the Weather Bureau forecast "a welcome change" from the long-lasting cold spell which has compounded the woes of the flood-swept border valley of the Red River between North Dakota and Minnesota.

To anxious river towns up and down the Midwest, the 30-day outlook on rainfall offered some solace from flood threat.

Rain "equal to or in excess of the seasonal normal" over most of the country is the prediction. But conspicuously missing from the forecast is the word "abundant", which the Weather Bureau used in its last two outlooks on future rainfall.

There is no indication that abnormally heavy rains will further harass flood danger areas, Jerome Namias, chief of the extended forecast section declared.

In three corner pockets of the United States, the extreme southwestern, southeastern and northwestern sections, there will even be some deficiency in rainfall, the forecast showed. That will be good news particularly in the Pacific Northwest, where the Columbia River has a definite flood potential unless rain holds off while winter snows come off mountain watersheds.

Where it will do good, rainfall is expected in the dry dust bowl area of southeastern Colorado, Oklahoma, northwestern Texas and northeastern New Mexico.

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CHEMISTRY

Silicone-like Boron Compounds Foreseen

► A CHEMICAL wedding between the element boron and organic substances promises to give industry a new family of compounds that may even rival the recent joining of silicon, carbon, oxygen and hydrogen to form the versatile new silicone plastics, lubricants and waterproofing substances.

At the American Chemical Society meeting experiments on new organoboron compounds, as they are called, were reported by Dr. H. C. Matraw of the General Electric Co., Schenectady, N.Y. and Dr. A. W. Laubengayer of Cornell University.

Boron is an element in the chemical scheme of things that is lighter than silicon but similar to it in many respects. In organic compounds it can be made to hitch its molecules into big chains that produce useful materials like rubbers, plastics and other liquids and solids.

Exploring how these new compounds behave, the two chemists found that they are similar to typical silicone compounds and to hydrocarbons. Butyl boric acid joins with polyvinyl alcohol, for example, as would be expected if it were to make a potential plastic.

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