QUEEN BEE JELLY

Walter Theimer

"Gelee royale" or royal jelly is the food of the growing as well as the adult queen bee. It makes a queen bee out of a common larva which would otherwise develop into an ordinary worker bee. For a decade or so, this nutritious juice has been advertised as a tonic and rejuvenant for men; its manufacture and sale have proved lucrative business propositions, the juice being [illegible] remained an Scien- as regards the value of this substance to men, though occasionally some doctors have reported to have seen tonic effects on the well-being of patients taking royal jelly. Such observations are always somewhat hazy. There is an undeniable share of psychological factors resting on a pre-existing belief in the juice. Even generous interpretation of findings on the jelly fails to reveal any effects exceeding those that have been achieved in mass experiments by administering placebos, if these had previously been suggestively described to the laity as medically active.

The Larva Must Be Very Young

With a view, not to men readily swallowing drugs and drug advertisements, but to bees in which the action of the juice is a positive fact, a German biochemist, Dr. H. Rembold of the Max Planck Laboratory of Biochemie at Munich, has had a closer look at royal jelly. The juice is active only if the bee larva is younger than 48 hours. If it is but one hour [illegible], whole jars of the jelly will be of no avail; the larva becomes a common worker bee. So determination of future development is effected at a very early stage. Basically every bee larva has the elements in it to become a queen but with normal nutrition their growth remains inhibited in favour of development into a worker bee. Only royal jelly, administered early, triggers royal development. So the action of the juice depends on very particular conditions even in the bee.

About one-third of one gram of the yellowish, milky

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jelly can be obtained from the cell of a royal larva. Nurse bees produce it in their glands. The cell of a worker bee larva contains only the sixtieth part of this amount of food jelly. It might seem that it is only the quantitative multiplication of the food which makes a queen bee out of the larva; an alternative would be to assume a different qualitative composition of workers' and queens' jellies. Dr. Rembold's analysis shows that both quantitative and qualitative influnces are at work, the latter being probably more important.

Promotion of Metabolism

Royal jelly must contain substances promoting metabolism. The metabolic performance of queen bees is staggering. Within a week the royal larva grows to 2500 times its initial weight. The adult queen bee which also feeds on royal jelly lays an egg every 20 seconds, its daily production reaching 2000 eggs a day during the main laying season. Now one substance known to promote metabolism has been found at Munich in royal jelly in ten times the concentration it has in worker bees' jelly. It is pantothenic acid, also known as vitamin B 5. If it is tried, however, to produce queens by adding pantothenic acid to worker bees' jelly, the outcome is negative. Pantothenic acid plays only an auxiliary part, while the real causal factor must be different.

Another compound, known as biopterin, is also concentrated in royal jelly ten times stronger than in worker bees' jelly. Again it proves impossible to make a queen bee by adding biopterin to workers' food. The physiological significance of biopterin is uncertain. It would seem that it has to do with the longevity of the queens, since the winter generation of worker bees, which also receives an increased ration of biopterin, lives much longer than summer bees do. Man excretes appreciable amounts of this vitamin, related to folic acid, without any specific effects being known. In the queen bee even biopterin is just one of the auxiliaries kept ready by nature to engineer the extraordinary metabolism of the queen bee once a queen bee has come into existence; but the auxiliary substance does not produce the queen bee.

A Preservative Acid

Royal jelly has an aromatic smell and is viscous. It contains 60 per cent of water and 10 per cent of lipoids, fat-like compounds among which Dr.

Rembold found a new fatty acid previously unknown. Together with Professor Butenandt, the famous biochemist in charge of the Munich research institution, Dr. Rembold found the chemical constitution of the new acid. To the chemist it is 10-hydroxy-decene-2-acid. It occurs only in the honey bee, yet worker bees' jelly contains just as much of it as royal jelly does. So even this acid cannot be the miraculous agent making a queen bee, and it has to content itself with the more modest task of acting as a preservative for the jelly.

A Cool Jelly Makes a Hot Bee

An American scientist, N. Weaver, succeeded some time ago in breeding queen bees from ordinary workers' larvae in an incubator by feeding royal jelly to them. But if the jelly had been stored in a refrigerator for some while its action decreased; only a few larvae grew into queen bees, the rest forming intermediate stages including a giant worker bee. Dr. Hanser of the Munich laboratory has now succeeded in making queen bees out of common larvae in the incubator even with royal jelly kept in cold storage for a year. The juice had been cooled deeply immediately on obtaining it, the main con deration being prevention denaturation of the sensiti proteins. It has now beco obvious that the decisi agent in royal jelly is sta enough to keep for so length of time, which rais hopes for the possibility isolating it. It may yet be h den inside the protein fr tion. Even proteins seeming equal in their general che ical nature and behavio may be very different as r gards the sequence and a rangement of their basic uni These subtle differenc which scientists are only b ginning to disclose by lab rious analytical techniqu play a vital part in biolog The substances in questic can also be nucleic acids compounds of such acids a proteins. The chances are th compounds of high molecul weight, with manifold pos bilities of coding constructi data in the arrangement their units, are the controllir agent in royal jelly.

The Munich researches w be the starting-point for fu ther experiments with jelli deliberately varied in the composition. This metho may help to find the respo sible factor in royal jel within the foreseeable futur

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