BIOLOGY

Twins That Are Alike And Twins That Are Unlike

By MARJORIE VAN DE WATER

AS ALIKE as two peas in a pod! This expression is immediately brought to mind by the sight of what scientists term "identical twins." And recent studies of identical twins by physiologists, psychologists, fingerprint experts, and students of heredity, have revealed that the old saying really understates the case.

Identical twins are more alike than two peas in a pod! The two peas, when they grow up into adult vines, lose their similar appearance. One vine may be tall and the other short; one thriving and the other puny. The human identical twins continue to resemble each other closely all through life, and often die of the same diseases.

But how about the minds that dwell within the duplicate bodies? Are they identical also? Psychologists are eagerly seeking the answer to these questions, and are searching out pairs of twins the world over for detailed study.

Dr. Albert F. Blakeslee, of the department of genetics of the Carnegie Institution of Washington, has recommended the starting of a special school in New York City at which the only pupils would be identical twins. The teachers would also be identical twins.

There educators could try out the new methods they devise. If one twin under the new method showed great improvement, while the other one of the pair, under the old method, failed to improve likewise, the experimenter could feel that the new method was better. In this school also the psychologist could give the mental tests designed to measure the native ability of the children, and find out to what extent the twin children will give twin answers.

The comparatively few pairs of twins that have already been given detailed study show a startling resemblance to each other. Two twin brothers who entered the Royal College of Physicians and Surgeons on the same day were so much alike mentally that Dr. Clement Lucas, an English physician interested in the pair, looked up their school records. Their various school papers had been marked by 17 different teachers a total of 66 times, and in only one case did they receive marks that were not exactly uniform. In that case the paper of one boy was called "excellent," while the other was marked "very good indeed." Both boys received the same number of points on the entrance examination to the medical school.

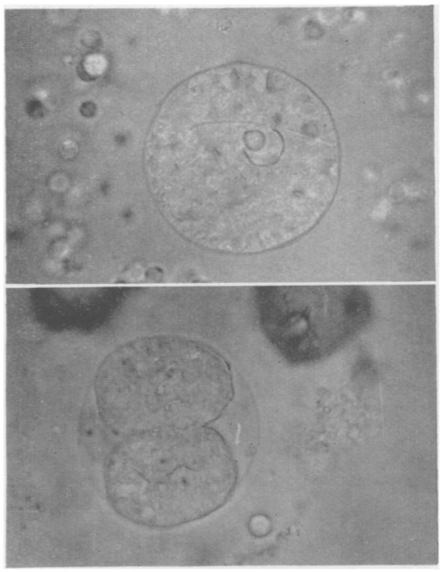
Can you think of any two brothers of your acquaintance, not twins, who could show a record of such exactly similar progress?

You may wonder whether this likeness is due to similarity in the way the twins think or whether it is just a result of their being together and consulting about the questions. Dr. Winifred Richmond, of American University, Washington, D. C., gives you the answer. She has given mental tests to twin children under circumstances making it impossible for them to get together about them at all. Yet they gave answers that were almost identical and received very nearly the same total scores in the grading. In the case of adult twins, especially those who have been brought up by foster parents in entirely different surroundings, it has been found that the two will respond a little differently to the mental examination. But the differences have never been so marked as the likenesses.

Always Interesting

Although twins have only recently claimed the attention of science, they have always been interesting to people in general and have been a favorite theme of the fiction writer. Some ancient tribes, and indeed a few parents in America, regard twins as a special curse, and would like to know how to avoid this doubling up in the nursery. Others consider them a special mark of distinction. In any case the announcement of the arrival of twins arouses an amount of excitement which the single child never stirs up.

And this excitement is not because twins are so very rare. In this country, about one per cent. of the births are twin births, but in many parts of Europe the rate is higher. In Heidelberg one birth out of every 52 brings twins. Rather it is the mystery of what



LIVES OF IDENTICAL TWINS

Begin in this fashion. Above is a single rat ovum, or egg cell, wich has been penetrated by the male sperm cell. Below, the ovum is beginning its first division which must continue to make the myriad cells of the complete body. But sometimes at a later stage the group separates and forms two distinct but identical animals.

produces twins and why they seem to be cut from exactly the same pattern in a world where there are certainly an infinite variety of molds.

No one can tell with certainty what causes multiple births. Some tendency toward them does seem to run in certain families. Twins and triplets usually appear in a family which has already known multiple births either on the mother's or the father's side. And one pair of parents will often have more than one set of twins. A record seems to have been made by a couple recently reported in Mexico as having, in the course of 40 years of married life, no less than 18 pairs of twins.

About the manner in which twins are formed, biologists have learned a great deal in recent years. Through the study in the laboratory of rats, armadillos, and starfish; by means of photomicrographs of the eggs of these animals through all the earliest stages of development; scientists have pieced together the amazing story of how two human beings can be formed from the single egg cell that ordinarily develops into one person.

All living creatures, from the humblest form of jellyfish to the wisest college professor, have the same beginning as a tiny single egg cell or ovum. But the egg cell very soon divides into two and then those two split into four, and

this process continues until, long before the birth of an infant, there have been developed all the myriad cells which make up the human body.

Way back in the very earliest part of your life, when that original ovum had divided into a group of several cells, half the resulting cells were destined to become the right-hand parts of your body—your right eye, right ear, right nostril, the right side of your brain, and so on—the other half became the twin parts on the left-hand side of your body. Biologists therefore say that every normal individual is a perfectly-balanced and combined pair of twins.

Once in a great while, because of something which disturbs the normal course of development, the cell may separate into two entirely distinct parts, each of which develops into a complete and perfectly balanced human being. These two individuals, coming from a single ovum, are what biologists call identical twins. It has been found that the right hand of one of these persons is more like the corresponding hand of his twin than it is like his own left hand. He is more like his twin than he is like himself!

Sometimes unfortunately, the cells will only split partially. Instead of producing either a complete individual or just the right side of the head, one half the cell group may develop half a trunk, but a complete head. This sort of freak growth results in grotesque two-headed monsters or creatures with three arms or legs.

Occasionally, each of the halves may become an almost perfect human body, and then we have the type of two-in-one creature known as Siamese twins.

Not all twins are identical twins, however. Some are merely ordinary brothers and sisters who happen to be born at the same time. Biologists have found that such non-identical twins, or fraternal twins, as they are sometimes called, do not come from the same egg at all but from two eggs which happen to become fertilized at or near the same time, resulting in two simultaneous births.

Fraternal twins may not even be of the same sex, and are no more like each other than they are like other brothers or sisters at the same age. Indeed, they may be striking contrasts—one blond and the other brunette, one growing slowly and the other rapidly, one bright and the other slow to learn.

The only striking difference that sometimes appears in the physical make-up of identical twins is what scientists appropriately call mirror imagery. The one twin, instead of looking exactly like the other will see his twin as he would see himself in the mirror. That is, his right side is like his twin's left side. Everything is reversed in the other twin. A right-handed twin will have a left-handed mate. The hair of one will part naturally on one side, while the other must comb his in the opposite direction.

This duplication in reverse can be noticed in even such minute details as the way the lips curve in a smile, and it accounts, sometimes, for a very different expression on otherwise identical faces. Even the lines in the palm of the hand correspond very closely for identical twins, although they may correspond either exactly right hand for right hand, or in the case of the mirror type of twins, right hand for left.

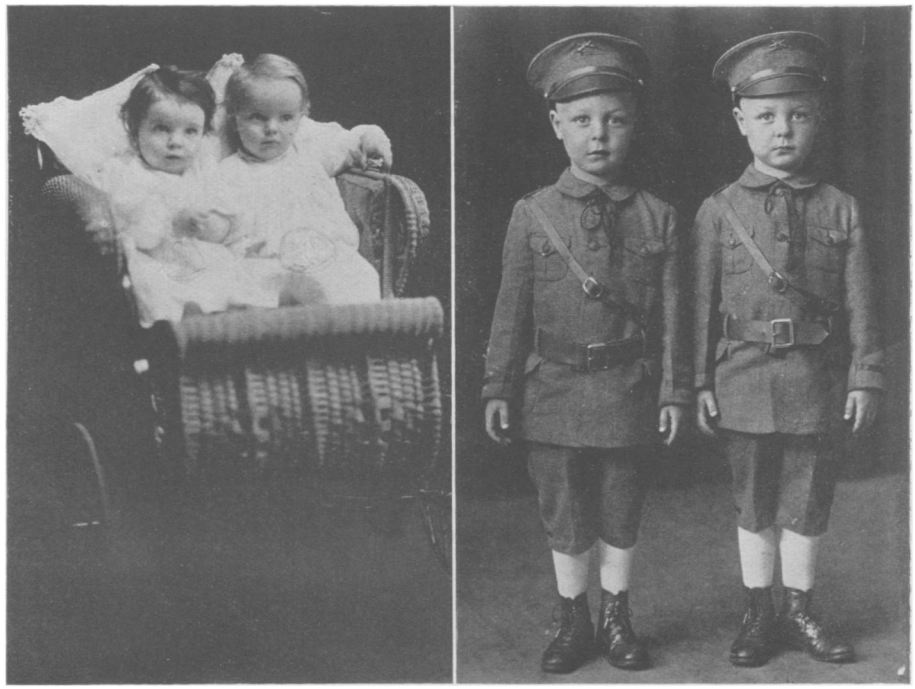
Finger-Prints Fail

Finger-prints which have long served as means of distinguishing one man from all his fellows cannot be infallibly used to tell one twin from another. In most instances, there are slight differences, but sometimes even the expert cannot tell which twin made a particular print. Handwriting, however, which has been thought by some people to betray the individual's secret thoughts and character, is not the same.

Prof. Johannes Lange, of the German Institute for Psychiatric Research in Munich, has studied thirty pairs of twins having one or both members in prison. Thirteen of the pairs were twins of the identical type, and of these ten had both twins in prison. Of the other seventeen pairs which were of the fraternal type, only two had both twins with a prison record. And when one of a pair of identical twins gains distinction in a favorable way, the other is almost bound to.

The Grosvenor brothers, for instance, selected different vocations, but nevertheless their careers have been singularly parallel. They went to school at the same age and graduated together. They entered the same college, and at the same commencement both attained that unusual honor of receiving their A.B. degrees "magna cum laude." Both have been writers, Gilbert as editor of the National Geographic Magazine, and Edwin as contributor to various law journals. Three clubs and two fraternities claim the membership of both, and in college they were enthusiastic about the same sports.

Tuberculosis has long been known to be a communicable disease, but physicians have also debated as to whether there was not also some hereditary predisposition toward the disease—whether two individuals might not be exposed to it in exactly the same way, and one



FRATERNAL AND IDENTICAL TWINS

Fraternal twins are merely brothers or sisters born at the same time. Identical twins develop from the same egg cell. See how unlike the fraternal twins are.

develop the disease while the other escaped unharmed.

If this predisposition toward developing tuberculosis is really a matter of heredity, then we would expect to find that whenever one identical twin had the disease the other would be pretty sure to get it also. On the other hand, we would expect it to be less likely that non-identical twins, or fraternal twins not having exactly the same heredity, would both develop the trouble.

A German physician, Privatdozent von Verschuer, member of the Kaiser Wilhelm-Institut fur Anthropologie und Eugenik in Dahlem, has just checked up this very point and reported the results he found to the Berlin Medical Society. He found 75 pairs of twins, one or both of whom had tuberculosis. Of the 75, 19 pairs were identical while the others were fraternal twins. The age varied from 1 to 57 years.

Here are his startling figures: Of the 19 sets of identical twins, only 2 had one healthy member, and those two were under 18 years of age. In several cases the twins had been separated and had grown up in entirely different surroundings, but they were affected by tuberculosis in almost exactly the same way.

Contrasted with this record is that of the fraternal twins. Of the 56 pairs who did not have the same heredity although born at the same time, 24 pairs had healthy members, and in only 12 pairs were both twins affected in exactly the same manner by the tubercular infection.

Science News Letter, December 27, 1930

ARCHAEOLOGY

Garlands Buried 3,000 Years Check Egypt's Calendar

GARLANDS of flowers tied across the breast of a dead Egyptian queen on a November day in the year 1049 B. C. have lain there for centuries in token of the respect and honor paid to an Egyptian royalty. Now, the flowers have found a strange, modern usefulness. They have served to reassure modern science that its efforts to match Egypt's calendar with our own chronology are accurate.

The mummy of the flower-decked queen, Meryet-Amun, was one of those discovered by the Egyptian Expedition of the Metropolitan Museum of Art. The expedition awaited a time when Prof. Percy E. Newberry of the Egyptian University in Cairo might identify the flowers. Now, the director of the expedition, H. W. Winlock, has reported to the Museum here that Prof. Newberry's examination has been made, with some singularly interesting results.

Faint Color Remained

"Such was the marvelous preservation of the flowers that some of them still retained a faint flush of color in their faded petals," Mr. Winlock writes. "Prof. Newberry could point out, without any question, blossoms of the acacia, petals of the lotus and of the red field poppy, and leaves of the willow."

A date marked on the wrappings of Meryet-Amun's mummy was translated into our calendar as approximately November 25, 1049 B.C. And Prof. Newberry pronounced that all of the flowers and leaves belonged to that season. The acacia tree blooms after the Nile flood has receded, late in November, and the willow is then in leaf. The poppies were probably garden flowers, he pointed out, for wild poppies blossom in the grain field in March, but garden poppies might bloom in Egypt almost any time.

Additional evidence that the method of reading the date on the mummy fitted the season of the year was found in some persea fruits, half-ripe, laid at the foot of the coffin. These would have been just beginning to ripen in Thebes in November.

Meryet-Amun herself was already four hundred years dead when the floral tribute was placed on her breast. Her tomb was one of those rifled by robbers, and when Egyptian tomb officials eventually opened it four centuries after her death they set about repairing the damage. Hence the new mummy wrappings, the new date, the garlands.

All that was glittering or precious was gone from the tomb when the tomb officials found it. The robbers had even stolen the artificial eyes and eyebrows off the mummy-shaped coffin, and the sheets of gold which sheathed the coffin inside and out. The tomb officials replaced the costly material originally used for the eyes and brows with a cheap glass. They had, it seems, only a day to make their repairs.

Meryet-Amun was the middle-aged wife of a boy king Amen-hotpe II, when she died. Her mummy has been added to the collections of the Cairo Museum, where many ancient Egyptian royalties now rest in safety and in retirement from public inspection.

Science News Letter, January 10, 1931

FLOWERS OF A QUEEN

Blossoms of acacia, petals of the lotus and of the red field poppy, and leaves of the willow, found adorning the mummy of Queen Meryet-Amun.

BIOLOGY

Magnetism Heals Mutilated Flatworms

MAGNETISM as a healing agency was suggested many years ago, but was seized upon and exploited by quacks to such an extent that it fell into complete disrepute. Now, however, comes a reputable scientist who has apparently been able to do something of the kind with a strong magnetic field, at least with lower organisms.

Prof. R. A. Muttkowski, of the University of Detroit, told the American Association for the Advancement of Science how he has exposed mutilated flatworms to the influence of a powerful electromagnet, and found that they regrew their lost body-parts more rapidly than did untreated "control" specimens. Too much of a good thing, however, proved harmful.

Science News Letter, January 10, 1931