GENETICS—PSYCHOLOGY

Twins May Become Unlike

Heredity Determines Inescapably That Identical Twins Look Alike; Environment May Make Mental Differences

By DR. FRANK THONE

QUINTUPLETS were a world-shaking event. Twins as a rule are only a local disturbance. But just because of their local proximity, they stir up as much interest in their way as simultaneous infants in larger batches.

Other people's conduct toward twins, and their own behavior toward each other, tend to heighten the interest that naturally attaches to them and thereby perhaps emphasize, and if possible increase, the natural close likeness between them.

Their fond mother dresses them alike. They are always kept together, and indeed in most cases seem to have a strong preference for each other's company. Often they develop a half-uncanny trick of thinking together, so that they both speak up at the same time and say the same thing, like a rehearsed chorus. In a world where people are all so different their similarities become a standing wonder, and even something of a social asset.

So much emphasis is placed on twins' similarities, and so much is done to preserve and heighten them, that it is sometimes questioned whether they can be different at all. There is considerable theoretical reason why true twins should never differ. True twins, identical twins that are formed before birth by the halving of the original fertilized egg, carry completely duplicate sets of genes, or units of heredity. Since genes are supposed to determine what you do as well as what you look like, two individuals with duplicate sets should be expected to be alike in both appearance and action.

But can such identical twins ever be different? Isn't it possible that environment might overcome the effects of identical heredity to some extent at least? Or are the genes all-powerful, so that twins will always look and behave alike no matter how different their surroundings?

It isn't easy to answer that question, because under normal circumstances twins are brought up together, sharing the same environment as they share the same heredity. Their very inseparability tends to frustrate scientific curiosity as to what would happen if they were separated and kept apart.

Yet much separated twins would be excellent material to study, for the answer to many psychological and sociological questions.

Scientists in other fields like to take identical samples of uniform material and subject them to different kinds of tests. Thereby they are able to estimate the comparative effects of various stresses and strains. Twins are the nearest thing to identical samples of uniform material that this complex stuff called human nature affords.

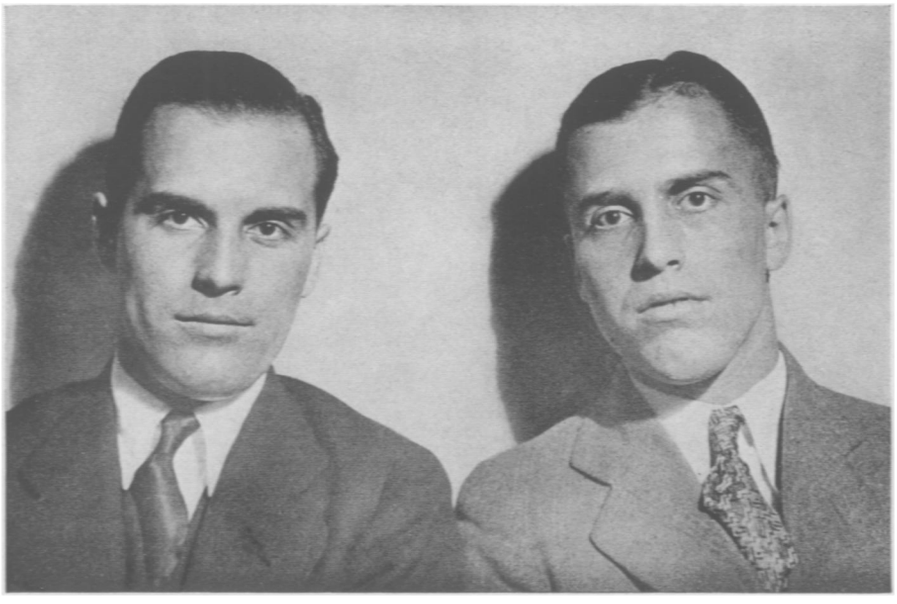
Of course no one would deliberately tear twin infants out of each other's arms and keep them apart for cold-blooded experimental purposes. But sometimes ill fate—death or divorce of parents, or other domestic calamity—will separate twins and keep them apart for years, sometimes until they are quite grown up. Accident accomplishes what scientists are too humane to do of deliberate purpose.

Three University of Chicago professors, Horatio H. Newman, biologist, Frank N. Freeman, psychologist, and Karl J. Holzinger, statistician, have collected records of twenty such separated twins and made an exhaustive study of them. Their results are reported in a new book published by the University of Chicago Press.

Twelve out of the twenty cases were separations during the first year of life; one was as late as seven years. The duration of separation ranged from eleven to about 53 years. Some of the separated twins had chances to visit each other at times, but in other cases contact was lost completely for years.

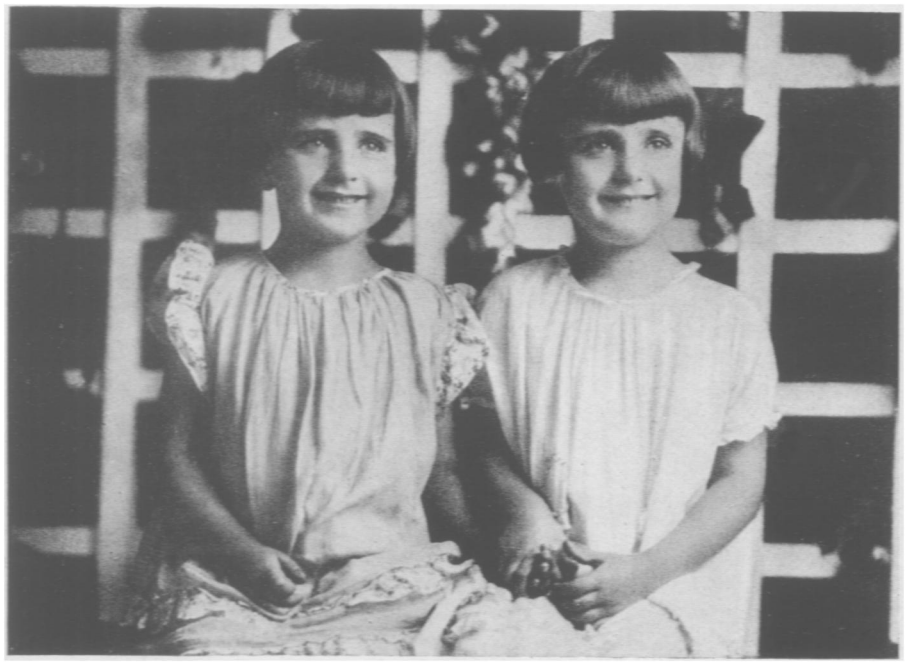
Some of the separated twins had approximately equal educational opportunities and fairly similar social environment, others differed widely in either or both respects.

In addition to these separated pairs of twins, the three Chicago investigators obtained detailed records on a much larger number of pairs of identical brothers or sisters reared together, so that they are able to offer comparative conclusions regarding relative effects of heredity and environment, when the



DIFFERENT

Paul C. and Paul O. They don't look much like identical twins, but they are, and despite contrasts in upbringing that have made them unlike in mental ability they are still rather similar emotionally.



ALIKE

Maxine and Virginia, at five. They have become less similar physically now, at least temporarily, because of a different medical and dietary history. But mentally and in personality traits they are still very much alike.

heredity can be assumed to be the same for both members of the pair.

In general, then, they find that "Human intelligence is not definitely fixed at birth by genetic factors but may be distinctly influenced by such environmental factors as education and social positions . . . Not only can intelligence be influenced by environment, but personality traits such as temperamental and emotional attitudes are affected by environment to an even more marked degree. But heredity is dominant in all physical characteristics except the obvious one of body weight."

That is, to sum it all up in a sentence: "Heredity determines inescapably what you are going to look like, but environment has a great deal to do with the way you think and act."

Intelligence tests were of course given to the twins, both those who had grown up together and the separated ones. In those reared together the I. Q.'s were practically identical; separated twins were hardly any more alike than total strangers.

Results of three educational tests were correlated with social differences in the environment of the separated twins, and the statistical average indicates that cultural features in social environment are also definitely effective in modifying the I. Q.

Results of comparisons of personal traits like temperament and emotion, it was found, could not be handled statistically. Either the differences are not measurable by the available tests, or else the factors in the environment which do produce such differences in personality are not those of formal schooling, social position or physical advantages.

However, on this side the case histories and plain human-interest stories that are recorded in the book bring out the points probably with more vividness than any amount of statistical data. Some of these human-interest yarns are almost spooky.

Take the case of Ed and Fred, for example. These twins, separated in infancy, lived without knowledge of each other's existence for 25 years. They were both reared as only children by foster-parents who had no offspring of their own, both being led to understand that they were own children.

Though they lived a thousand miles apart they had about the same educational experience, and both found employment as repair men in branches of the same great telephone company. They were married in the same year and each had a baby son. Each owned a fox terrier named Trixie. According to their statements, both of them from early childhood were obsessed with the idea that they had a brother who had died and often stated this to their playmates.

Finally, through a remarkable coincidence they were united. They came to the Century of Progress in Chicago, where Prof. Newman was busily measuring up twins. There they fell in with a pair of young women twins, and went about seeing the sights with them. Once, in a Siamese-twin sideshow, these double twins among the spectators simply "stole the show" from the professional freaks!

This was a case of almost uncanny resemblance and coincidence, despite separation. Most of the separation stories, however, show some rather marked differences.

Then there is the case of Maxine and Virginia. They are a pair of lively youngsters, now about twelve years old. But because Virginia was once threatened with tuberculosis and was put through a course of "feeding up", she is taller, heavier and physically a year more mature than her twin. On the mental and emotional tests, however, they came out very nearly alike. Their social backgrounds are nearly the same, which may help explain that.

Eleanore and Georgiana are grown young women now. Orphaned in infancy, they were adopted separately before they were two years old. Eleanore received very little formal schooling, because she had to drop out and take care of her invalid foster-mother. Paradoxically, Georgiana received a better education because her foster-mother died; she was placed in a church school and stayed there until she was well trained in music and had gone through the teachers' course. Subsequently she taught school for a time. But both girls are now in nearly the same kind of work: one is a doctor's assistant, the other as a dentist's. And Eleanore, despite of her relative lack of formal education, is rated as very efficient.

Differences in environment showed up sharply when the two girls were given a course of tests. In all of them the better-educated Georgiana surpassed her sister. In tests for emotional reaction they are again different: "Georgiana is more rapid and uninhibited, and Eleanore is more aggressive . . . Georgiana appears to have more dislikes, fears, worries, and neurotic symptoms than Eleanore, but her attitudes are more conventional.

One case of identical twins coming to look unlike is that of Paul C. and Paul O. You would hardly take them to be identical twins now, but the most critical physical tests indicate that they are.

Paul C. has had much experience in city and business life since he was thirteen, while Paul O. (*Turn to Page 158*)

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has had an exclusively rural environment. Paul C. was brought up as an only child, while Paul O. had a younger foster-brother and -sister.

Paul C., the city-reared, proved superior in the tests of general mental ability and educational achievement. Paul O. beat him, however, in the arithmetic section of the Stanford test. In the temperament and other personality tests, both brothers reacted about like, both being rather slow and deliberate, rather careful and interested in details, and only moderately aggressive. There were one or two marked differences, however; Paul O. proved more rapid in making decisions and more resistant to opposition than Paul C., but less marked in his reaction to contradiction.

So it runs through the whole series of cases. The separated twins, not having each other around for mutual influence and imitation, often with sharply contrasted social backgrounds and economic experiences, ceased in many respects to be as like as the proverbial peas. The pod was broken, and the peas became different.

Science News Letter, September 4, 1937

RADIO

September 7, 4:15 p.m., E.S.T.

AMONG THE BEDUINS OF NORTH ARABIA—Henry Field of the Field Museum of Natural History.

September 14, 4:15 p. m., E.S.T.

MENTAL HYGIENE OF WORK — Dr. George K. Pratt, psychiatrist of New York City.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

MEDICINE

Free Blood Transfusions Made Possible by Red Cross

FREE blood transfusion service for patients suffering from dangerous loss of blood is the latest peacetime life-saving activity sponsored by the American Red Cross. Started by the Augusta, Ga., chapter, the movement is now spreading to other communities.

Bane of emergency hospital surgeons has been the difficulty of getting plenty of blood of the right type quickly to save lives threatened by blood loss. Autos crash, the bleeding victim is rushed to the operating room, his blood is "typed" and two pints of the requisite type are found to be needed at once. Then there is a hazardous delay, during which the patient may die, while a blood donor is located whose blood is of the corresponding kind. Adding cost to tardiness, blood donors usually charge high prices per pint—$40 in one eastern metropolis.

All this is different under the plan recently put into successful operation by the Augusta, Ga., chapter of the American Red Cross. In close cooperation with physicians of the University of Georgia Medical School and Hospital, the Chapter has rounded up 600 potential heroes and heroines, given them physical examinations, recorded their blood types, turned over names, addresses and telephone numbers to the hospital. All 600 agreed to give blood free. At night, sirening police cars taxi donors from home to hospital.

Already the free service in the life saving fluid has snatched many an accident victim and maternity case from the edge of the grave. The chapter chairman himself, by chance, was the first donor called.

Science News Letter, September 4, 1937

INVENTION

Novel Oil Tanks Keep Ships From Rolling in Heavy Seas

OIL has been poured on raging seas to calm turbulent waves which threaten shipwreck. Now comes Edward R. Carroll of Brooklyn, N. Y., with an invention which is intended to do the same thing but keeps the oil in the ship's tanks.

The invention provides an ingenious control of the swishing of the oil inside the tanks which counteracts pitching and rolling of the ship. Used on battleships, it would keep the ship steady so that the aim of its guns would not be spoiled.

Carroll's invention, described in a patent (No. 2,077,143) recently granted to him, is designed for ships with engines that burn oil for fuel, such as Diesel engines. The ships would be provided with double bottom and wing tanks built in the sides. In these the oil is stored.

Unlike the conventional storage tanks, these tanks and the double bottom are divided up into long cells by iron plate-like partitions. Valves in the partitions can be controlled from a central station.

Valves Control Flow

By opening and closing the valves, flow of oil from one cell to the other is controlled.

Whenever the ship begins to roll, the valves distribute the flow of oil so as to act as a counterweight to the roll. Thus, when the ship tips to starboard, all the oil cannot move instantly toward that side. It is held on the port side and, acting like a person on a see-saw, helps to right the ship.

Similarly any synchronism between waves and motion of the ship which leads to violent rolling would be broken up. Such synchronism increases the roll to the point where it endangers the ship. It is brought about by the same principle involved in swinging. Just as a slight push at the proper moment sends the person in the swing higher into the air, so waves in synchronism with the roll of the ship, can cause it to roll and pitch more and more steeply.

Science News Letter, September 4, 1937

In the Balkans, tea-like beverages are made from a wide variety of native plants.

Although tuberculosis deaths have lessened in Britain, this disease still rates next to cancer as a killer.