PSYCHOLOGY

Proving That Baby Can See

It Has Been Thought That Newborn Babies are Blind, But a Skeptical Scientist Has Upset This Theory

By MARJORIE VAN DE WATER

"CAN HE SEE ME?"

This is often the first question asked by the young mother when she looks at the depths of solemn mystery in the eyes of her newborn baby.

The answer has heretofore always been "No."

Until now it has been generally thought that the young infant comes into this world as blind to its beauties as a young kitten. The experienced mother of a brood would tell you that he could not possibly see, because the bright colored bauble dangled before his eyes brought no response from the drowsy baby.

The anatomist would cite for you rules to prove that it would be physically impossible for the infant to see. The eye is not sufficiently developed at birth, he would say with an air of finality.

It remained for a skeptical psychologist, Dr. W. C. Beasley, of the Johns Hopkins University, to answer, "Well, suppose we examine the babies and test their eyesight. Let's forget all the rules and find out whether they do see."

As a result, he was rewarded by a surprising upset to theory. Babies' eyes can see!

The discovery was not made without overcoming some obstacles, however.

It is not possible to present the newborn with the customary visual acuity chart and ask him to read off those meaningless letters " E C D B Z," and other letters of the alphabet. He would merely blow bubbles at you and say, "Blah!"

Neither are his gropings for his mother any scientific evidence that he can see, for in this he may be guided by other senses—touch, temperature, or hearing, for example. And, indeed, he is so clumsy in his efforts that his blundering has been considered as demonstrating his lack of vision.

When displeased, the newborn screws both eyes tighly shut, apparently to leave more room for the mouth to open and emit wails. And when content, he lies like a silent Buddha as though defying anyone to learn what is in the mind behind those eyes.

How would you go about testing the vision of the newborn?

Dr. Beasley's solution of the problem was as simple as the famous method Columbus devised for standing an egg on end—by crushing the end. It is a test that you can easily try for yourself. The psychologist made use of a little pocket flashlight—the sort that look like a fountain pen and are available at almost any corner store. Over the end of this he carefully wrapped three layers of tissue paper so that the tiny light should not be too strong for the sensitive eyes of the baby.

Eyes Follow Light

And then, when the baby was lying in the dark, Dr. Beasley flashed on the light. At first, there was disappointment. The infant paid no attention. Then the scientist moved the light slowly back and forth, nearer the infant's eyes and then away again, until finally, by watching the baby's eyes he could detect a fixation on the light.

Next, keeping the light at the same distance from the eyes of the infant, he slowly, gradually moved it in an arc across the child's field of vision. The baby's eyes followed!

When the light had moved past where the child's eyes could follow it, the baby turned his head!

There could no longer be doubt that the young infant can see a dim light in a dark room. For when he turns his head to follow a light, it must be because his eyes respond to it.

The next thing to find out was whether the newborn can see ordinary objects as well as a light. Of course it might be that this turn of the head toward the light is a sort of phototropic action not the same as normal vision.

Dr. Beasley's next test therefore followed the same procedure as before except that it was conducted in dim illumination and in place of the flashlight he now used just his fingers, fluttering them before the eyes of the baby. Again the child not only followed the moving fingers with his eyes, but actually turned his head to watch them. So it is evident that he is not only responsive to light but can see objects. An additional test with a little rod, dark blue in color and just a little bigger around than the fountain-pen flashlight, brought the same results.

And the tests have been repeated by Dr. Beasley many times—altogether 829 tests were given to 109 different white babies, and over a thousand trials made with 142 dusky little mites from the Negro nursery. All were under twelve days old and some had been in this world but a scant two and a half hours.

Every single one passed the vision tests. Every one could see.

Nevertheless, a wide range of individual difference was found in the visual ability of the babies. Race differences were observed, too.

The experimental apparatus was carefully designed for the baby's comfort. Scientists experimenting with these little bits of humanity always take the greatest care to protect them against any possibility of danger or discomfort. This sort of test could be conducted only when the baby was awake and content. If he cried the experiment would have to be abandoned. If he dropped off to sleep, he was awakened by a light touch on the sole of the tiny foot—the way used by nurses who wish to wake the baby for dinner.

Looks at Mirror

The baby lies flat on his back in the crib-like cabinet and is taken back and forth from nursery to experimental room in it, riding smoothly on rubber tired casters. The object he is to look at is held directly over his face, so that he doesn't have to turn in any awkward positions to see. In tests using colored lights on a screen, the screen is placed at the foot of the crib, but the child views it in a mirror placed above his face.

The crib is so arranged that motion picture apparatus can be attached to it for making a permanent record of the eye movements of the baby, and there is also a mounting for a specially designed telescope used to magnify the tiny eyes.

This telescope has revealed interesting

things about babies' eyes that are new to science. The protective device nature provides for shielding the eye from painful intensities of light—a reflex contraction of the iris—is totally absent in many newborns. Some do not show it at all until they are a week old. All the babies improve in this response during their first two weeks. It is the weakness of this reflex that makes it advisable to keep the new baby away from dazzlingly bright lights.

The ability to fixate both eyes on the same object is another which improves markedly during these first important days of life. If you are trying Dr. Beasley's tests on a young infant of your own acquaintance, move your pen or fingers patiently back and forth from a distance about six inches from baby's nose to fully 12 inches. Somewhere within this range he may be able to fix both eyes on it as early as his very first day. Do not be worried if he can't, though. Some infants can't do it until the second or third day—some not until toward the end of the second week.

Some fixate a single object with both eyes, but others do not. It is this lack of ability to fix both eyes on a given object that gives the young baby that occasional "cross-eyed" or "cock-eyed" look.

Another ability concerning which Dr. Beasley has accumulated new information is the power of the lens in each eye to adjust itself to the changing distances of an object from the eyes of the infant. Unless these lenses, one in each eye, are in focus for the object viewed, the impression which the person gets is one of a blurred object. Since the distance from the center of the lens to the retina of the eye is shorter in newborn infants, and since their lenses do not adjust readily to different distances, the newborn are "nearsighted."

Can a newborn baby notice the difference between a pink blanket and a blue one? Does he realize that the hue of either varies from that of his white pillow slip?

Dr. Beasley's experiments have paved the way for color-vision tests of the newborn and he hopes to give these tests to many infants during the coming year.

This is the test:

On a screen at the foot of the baby's experimental crib will be focused a round spot of colored light. The brightness of both the spot and the background can be varied at the will of the experimenter. Both will be reflected in a mirror placed at an angle above the infant's head, and this mirror can be adjusted until the spot appears at just the right distance from the baby's eyes.

Now if the baby follows the movement of a cherry-colored spot as it dances about over a leaf-green background of similar brightness, this will demonstrate conclusively that that child is not colorblind to red and green. Since the colors can be varied at will, the child can be similarly tested for any type of colorblindness.

Following the spot is an absorbing game for the young baby, it has already been found in tests designed to measure his keenness of vision. In these tests the lights were not colored; the background of the screen was black and the spot was varied from quite a bright light to a spot so dark that it could not be distinguished from the background. A line of light has also been used for the same purpose.

The baby only a few hours old will follow the movements of a line only an eighth of an inch wide and only very slightly different in brightness from the background. Spots are followed even more readily than the lines.

Individual differences between different infants were very noticeable in all the various visual abilities, and soon it was suspected that those who were most advanced in this regard were the ones who for one reason or another were more fully developed at birth. Perhaps they had received better nourishment or some other advantage from their mothers. Individual infants differ tremendously in their physical development at birth.

Negro babies were found to be superior to the white infants in the vision tests, and they were also more fully developed physically at birth. One little dusky piccaninny even tried to crawl or squirm off the crib while the tests were in progress.

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In storing fruits and vegetables commercially, government scientists find that temperatures should be fairly constant, even variations of two or three degrees above or below the desired temperature being too large in most cases.

Singing in the bathroom is popular, explains one physicist, because the singer listens not merely to his own voice but to the musical notes characteristic of the room, and in small rooms lined with tile or hard plaster this resonance is particularly evident.

ELECTRICITY

Electric Piano Has Keyboard But Lacks Strings

PRODUCTION has started in Kalamazoo, Mich., on a piano with no strings. Instead of having lengths of wire to produce the tones, short slivers of steel only a few inches long are vibrated by electricity.

The new instrument, called a clavier, uses a piano keyboard to actuate tone production, in which the note produced is 90 per cent. fundamental and only 10 per cent. overtones, just the opposite of an ordinary piano. Tones are produced by plucking a steel bar which has been properly grooved. The almost inaudible tone is picked up by magnetic induction and passed through an audio-frequency amplifier.

The amplifier unit is specially designed, having a capacity of 30 watts, as contrasted to the two or three watts of the average radio amplifier. Thus the player has at command a tone ranging from a mere whisper to one balancing an orchestra, with little distortion or dilution. In the instrument the impact noise, sometimes audible in a piano, is filtered out, producing what is said to be pure tones, capable of blending with other tones.

The piano was developed by Prof. Lloyd Loar after eight years' experimentation. He was an early experimenter in amplification of tones through electrical means.

It is said that through use of ear phones the piano student may practice his lessons without disturbing anyone, tones being heard only by him. A turn of a dial enlarges the tone capacity, if desired. The piano of the future, employing the tuned sliver-of-steel method, will consist of little more than the keyboard, as the piano movement occupies only a few inches of space.

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CHEMISTRY

Pure Vitamin Obtained In Quantity Now

A METHOD for obtaining pure vitamin B_1 in large quantities has been developed by Drs. R. R. Williams and Walter H. Eddy, Teachers College, Columbia University. Chemical details of the method are given in a report to the Carnegie Institution of Washington just made public.

By this new method, which is still in