Everybody knows the white-tailed deer. It is distributed throughout North America, occurring in every state except Alaska and possibly Utah. Its range extends north into Canada and south through Mexico into Central and South America. Normally it has a reddish-brown coat in summer and a dark grey or greyish-brown one in winter. The underside of the tail is white and the fawns at birth are spotted.

However, when Paul Mengel, a student at the University of Virginia, looked outside one day last fall, he was confronted by the animal shown here in his photographs. He was looking at a white-tailed deer, but it was an albino white-tailed deer, a form in which all pigment is absent. Instead of being merely white-tailed, the deer is totally white.

The albino form, which occurs in many mammals including man, differs from the normal form in only one genetic factor. To understand this, a brief explanation is necessary about the way heredity operates.

The chromosomes which carry the hereditary material, or genes, occur in pairs in each cell of a mature animal. For every character under simple control there are two genes, one on each chromosome of a pair. When one of these paired genes is dominant and one is recessive (or when both are dominant), the resultant character which we see is the expression of the dominant gene. For a recessive character to show up in the animal, there must be two recessive genes, one on each pair of chromosomes. The dominant gene is absent and the animal is said to be homozygous for the recessive gene. This is the condition in albinos. The deer in the photographs is homozygous for the recessive controlling pigment formation and hence coat color. When expressed, this gene causes failure of all pigment formation and the animal is an albino.

When the dominant gene is present, the albino gene is not expressed and the animal has a normal coat color.

The chemical mechanics behind albinism are surprisingly simple. In the normal animal there is a substance called tyrosine which goes through a series of chemical reactions, controlled by an enzyme called tyrosinase, to produce a dark pigment called melanin in special cells, melanocytes, in the skin. Everything is present in the albino animal, even the melanocytes, except the enzyme tyrosinase. By failing to form tyrosinase, the albino gene effectively cuts out the production of all pigment in the animal.

One place where the pigment is sorely missed is in the eye. Normally, the retina is pigmented. The pinkness of the albino eye merely comes from the blood vessels of the eye. Vision is impaired, and the albino deer cannot tolerate the same intensity of light as a normal animal.

A white deer has other disadvantages too. The normal coat color is much less conspicuous against the background vegetation, and deer depend partly on camouflage for protection. When mildly disturbed, a deer frequently slinks off into the underbrush with his tail down, white underside not showing, and relies on the cryptic coloration of his coat to hide him. When alarmed to the point of flight, the tail is raised, displaying the white underside like a flag, while the animal bounds away with a char-
characteristic slow, bouncing gait. Only when pushed still further will the deer put his tail down again, abandon the slow bouncing gait and run just as hard as he can go. Drs. Hirth and McCullough from the School of Natural Resources in Michigan have investigated the exact purpose of the tail-flagging behavior and have concluded that it serves mainly to keep the group together, a performance which is beneficial for the group when threatened by a predator. In other words, it acts as a signal to the group that they are starting to take flight. If the flight develops in real earnest, the signal is abandoned and each deer concentrates on running as fast as possible.

An albino deer cannot benefit in the same way from this behavior since his white coat makes him more conspicuous at all times. He may show the same behavior but it will not do him as much good. Albino are usually seen by themselves. Probably they are not acceptable as members of a group and hence, for two reasons, are more vulnerable to predators, such as wolves and mountain lions where these occur, and of course, to man.

Close scrutiny of the head of the deer in the photographs reveals the two little knobs which tell us that he is a young buck, probably one or two years old. In Odocoileus virginianus only the bucks have antlers. These are shed in the first couple of months of the year and the new ones start to grow in April or May, becoming fully hard by September when the velvet is shed. The white deer here is still in velvet.

Although they are primarily a woodland species, white-tailed deer occupy a wide variety of habitats. They do not migrate but they are capable of a certain amount of seasonal wandering in search of the best feeding areas. In places where the winters are cold, they tend to remain in deep woods during the cold weather, feeding on woody plants. In the spring they will move out more into open country, feeding on herbaceous vegetation as it starts to grow.

White deer are delicate and unusual creatures and have been revered in legend and history. Many early tapestries show white deer, often being enthusiastically hunted. The White Hart must be one of the most popular names for an English inn, and there is always a fine, painted sign showing a noble albino beast.

Unfortunately, when the recessive gene for albinism is "unmasked," other deleterious characters may also be expressed. Besides their poorer eyesight, albinos are more susceptible to disease, are less vigorous than normal animals and have in general a reduced viability.

Paul Mengel's deer certainly does not show any weakness in the photographs. He is a fine young buck and looks in very good condition. Let us hope that he stays that way for years to come and gives us more chances to observe him as he grows.

This picture illustrates how easily seen the white deer is in natural cover.