A special study of the Antioch hippodrome, by Prof. W. A. Campbell of Wellesley College, reveals that the structure was built in the fourth century and was abandoned in 526 after it was destroyed by an earthquake. The arena enclosed an area shaped somewhat like a football stadium, though twice as long in proportion to width. A slight curvature in the sides was designed, Prof. Campbell believes, to provide the charioteers an opportunity to maneuver for position after the turns. Destruction of the hippodrome was so complete that only the base remains.

Antioch had another stadium, the expedition discovered. Remains of this one, made of brick and stone, have also been excavated.

Among other discoveries, Prof. Elderkin describes a terra-cotta tomb in a Roman cemetery. In this tomb lay the skeletons of a man and woman so placed as to indicate that when the couple were buried the woman's head lay upon her husband's shoulder.

"Such an intimate grouping," writes Prof. Elderkin, "is, I believe, without parallel."

Science News Letter, October 8, 1932

EVOLUTION

Dogs Are Just Beginning Evolutionary Loss of Toes

FIVE FINGERS or toes on each hand or foot are so usual that it is necessary to look carefully at a horse, cow, sheep or dog to realize that all animals are not similarly equipped. The horse has only one toe which is his hoof, the cow and sheep have cloven hoofs or two toes, and most dogs lack the big toes of the hind feet. But the common ancestor of all the mammals had five digits on each extremity, like man. This is known from skeletons of prehistoric animals and a comparative study of the anatomy of living animals. Missing toes have been lost in the evolutionary process.

Prof. Charles R. Stockard of Cornell University Medical School has studied inheritance of fingers and toes to throw light on the way in which evolution operates. He now has evidence that the big toes of the hind feet disappeared or degenerated first. Then the thumb of the hand or front foot was lost. Next the little toe of the hind foot and then the little finger or toe of the hand or front foot became rudimentary, and so on.

The dog in most breeds has five toes on the front feet and only four on the hind feet. It is just beginning to undergo evolutionary loss of digits. Prof. Stockard cross-bred pure line great Danes never known to have hind feet big toes with unusual St. Bernards with great toes. As a result the hybrids all had big toes and in this respect evolution was reversed.

Some were so enthusiastically big-toed that the big toes were doubled. This happened so frequently that Prof. Stockard concluded that this doubling, or growing of six toes where five might be expected, is a sign that evolution is about to discard the toe. The doubling of a digit is strangely enough an indication of weak or poor development and not strength.

Six fingers or toes on human beings caused by doubling of fingers or toes is not rare, for medical literature records many instances. Taking this in connection with the doubled toes in his dogs, Prof. Stockard reads in this a forecast of evolution's intention. He ventures a suggestion:

There is a possibility that the human hand of the future may possess fewer fingers.

Science News Letter, October 8, 1932

PUBLIC HEALTH

Parrots Quarantined In Infected Areas

DON'T make friends with any parrots, love birds or parakeets from California unless they have a certificate from a health officer declaring them free from parrot fever.

This warning has been issued by Surgeon General Hugh S. Cumming of the U. S. Public Health Service. It is intended to protect people from psittacosis, or parrot fever. If they fail to heed the warning, they run a good chance of getting this serious, often fatal disease.

Some of the breeding aviaries of Southern California, where birds of the parrot family are raised, are infected with psittacosis, an officer of the U. S. Public Health Service found in a study undertaken at the invitation of the California State Department of Public Health. Birds from these aviaries may give the disease to unsuspecting bird owners and friends.

So, to protect the health of people all over the country the Surgeon General has issued his warning. But he has done more than warn. Upon his advice, Secretary of the Treasury Mills has just amended the interstate quarantine regulations so as to prevent birds from infected areas being shipped for sale beyond the borders of the state.

By Secretary Mills' order, the interstate transportation of birds of the parrot family by common carriers is now limited to those birds certified by the proper health authority of the State as coming from aviaries free from infection. Bootlegging of the birds is expected, however.

In Southern California, and particularly in Los Angeles, these birds are often raised in private families by ladies wishing to make pin money. Many of the birds are peddled from house to house. One case of psittacosis in Oregon was traced to a California love bird sold in this way.

Science News Letter, October 8, 1932

CHEMISTRY

Appearance of Age Sprayed on Copper

THE PLEASING green coloration that copper and its alloys assume after years of exposure to the weather has been considered as reliable an indication of age as the wrinkles and gray hair of an old man.

This is no longer true. A preliminary treatment with chemicals can now be used before installation to turn the freshest copper roof or spire into one of venerable appearance with pleasing patina or verdigris. Two Waterbury, Conn., metallurgists, John R. Freeman, Jr., and P. H. Kirby, have worked out a method for rapid development of patina on copper.

Discovery of the method of making artificial patina was delayed because a false conception as to chemical composition of patina had existed. Authorities had considered the patina to be a basic copper carbonate while analyses of green coloring matter on New England copper roofs from 78 to 16 years old showed that patina consists practically wholly of basic copper sulfate. In England also basic sulfate was found to be

the cause of rich green color on old copper roofs. Sulfur dioxide put into the air from burning coal provides the sulfur that reacts with the copper to form the patina.

But even badly polluted industrial atmospheres require 10 to 14 years to develop patina by natural weathering. Architects demanded a quicker action green coloring method.

A ten per cent. solution of specially conditioned ammonium sulfate was finally hit upon as the effective coloring chemical. After suitable treatment with this solution copper can be made to acquire a patina in 24 hours that compares with nature's product of 10 to 14 years of exposure. The complete process is described in *Metals and Alloys.*

In England success in forming patina by electrolytic methods has been reported and that process is said to take only fifteen minutes. Dr. W. H. J. Vernon of the British governmental Chemical and Research Laboratory at Teddington found that an ammonium sulfate solution treatment that he perfected breaks down under severe weather conditions and he therefore turned to an electrolytic process.

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PUBLIC HEALTH

Cancer Increases As Other Diseases Decrease

INCREASE in cancer is real and is due to two factors. In the first place, more people are escaping the hazards of youthful diseases and are living to the age at which cancer attacks. Second, and even more important, more of these people who live to the so-called cancer age are being saved from dying of other diseases, such as pneumonia, which formerly took a large toll at cancer age.

These conclusions, based on a study of Canadian vital statistics, were reached by Dr. Madge Thurlow Macklin, of the University of Western Ontario Medical School, at London, Ont. They were made public in the *American Journal of Cancer.*

Dr. Macklin compared death rates from cancer and from all causes in Canada at various age levels since 1901. She found that as public health measures decreased the prevalence of preventable diseases like smallpox, yellow fever, malaria, diphtheria, and tuberculosis, the age of the population changed. More people now live to be over 40 years than did in 1901. At the same time the cancer deaths increased, not only in the general population but in the older age groups.

"The cancer rate might justifiably be used as an index of the state of preventive medicine and sanitation in a country," she stated. "Those with good public health organizations have a high cancer rate; those with a low cancer rate show poor public health facilities.

"Not only does preventive medicine bring more people to the cancer age, but it keeps them from dying of preventable causes after they get there, so that it is inevitable that the death rate from some few diseases, not preventable at present, will mount," she explained.

That Dr. Macklin is not unduly discouraged by her findings is evident from a concluding sentence, the philosophy of which should prevent people in general from taking a too gloomy view of the situation.

"We must all die of something," she pointed out, "and it is inevitable, as we eliminate one cause of death after another, that we increase the death rate from the causes that remain, for while we may increase the length of life, we do not decrease the certainty of death."

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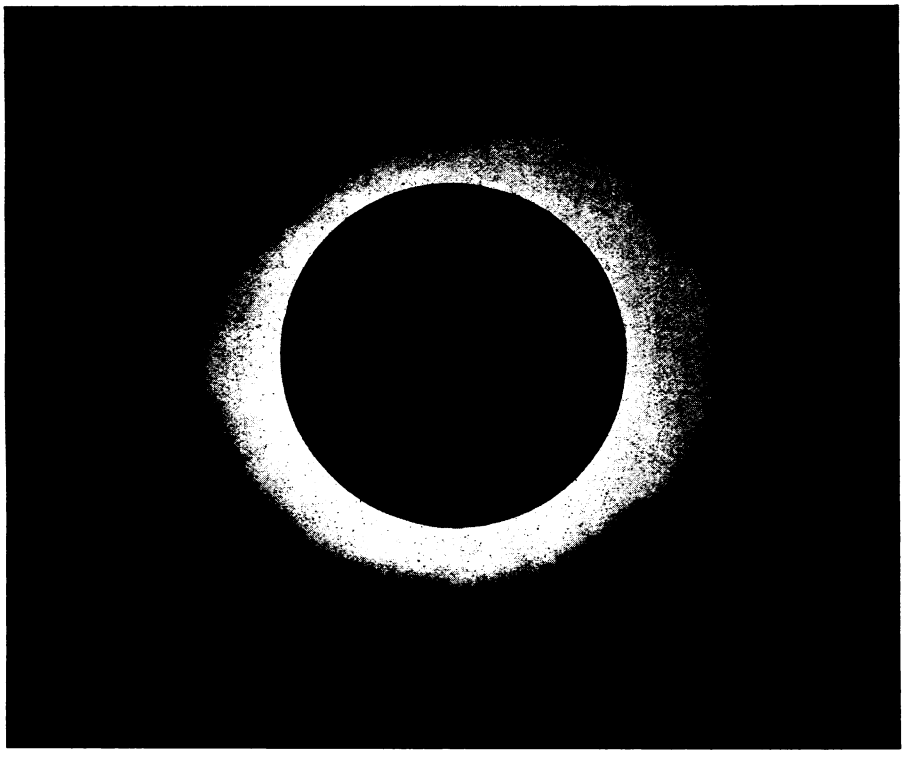

SOUVENIR OF THE ECLIPSE

Many astronomers sought in vain at the Aug. 31, 1932 total eclipse of the sun for a likeness of the phenomenon so well reproduced here. This picture was taken at Fryeburg, Me., by Dr. Heber D. Curtis, director of the Observatory of the University of Michigan, Ann Arbor, Mich. Dr. Curtis used a camera of 40-foot focal length and exposed the film for 34 seconds.

BOTANY

Autumn Brings Nobility Even to Cornfield Weeds

See Front Cover

AUTUMN is the time of the Truce of God. Even as a beggar may assume a certain dignity when he is about to die, so the commonest weeds often take on beauty when all things pause to make last salute to the retreating sun, before the *hora novissima* of the first heavy snowfall. For the cover picture of this issue of the SCIENCE NEWS LETTER, Cornelia Clarke has made a camera study of four seed-heads of the common velvet-leaf, *Abutilon theophrasti,* that has most sympathetically captured something of its air of a Villon repentant.

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