of the foot become badly disorganized. It is this type of fault that leads to disorders of the main arch along the inner border of the foot.

When the first metatarsal bone is short, this affects the foot especially in active functions such as walking or running, when the foot is used as a lever. Such a foot can be identified by its appearance, because, for one thing, the second toe is invariably longer than the great toe. Another common sign is the pressure of callus on the sole of the foot, just behind the second and third toes.

There is no such thing as an anterior metatarsal arch. It is an erroneous concept we have inherited from the past century. The pains and calluses that have been blamed upon a "falling of such an arch" are really due to the uneven distribution of body weight upon these bones we have been mentioning.

In order to reestablish normal function in such cases it is necessary to know the nature and position of the underlying fault. Efficient care has been given to such cases by the prevailing methods of treatment which include strapping, arch supports, rest periods, and special exercises. But from these studies there has been a new and very simple method developed which applies directly to a correction of disordered weight distribution. This is simply an extension on a light insole that forms a platform under the first metatarsal bone. It raises the supporting surface of the ground to a level that makes the bone perform its normal duties, and by so doing relieves the strain of uneven weight distribution and inhibits the growth of painful callus.

This new method of treatment has been used on many cases as part of our scientific investigations during the past ten years. The research work on which it is based has only recently been published in completed form, in *The Human Foot* (Columbia University Press).

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There are waltzing rats, as well as waltzing mice.

●RADIO

October 13, 3:15 p.m., E.S.T.

SOIL AND SOCIOLOGY—Prof. Paul B. Sears of the University of Oklahoma.

October 20, 3:15 p.m., E.S.T.

SCIENCE AND HOUSE PLANTS—W. R. Beattie, Senior Horticulturist, U. S. Bureau of Plant Industry.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

CHEMISTRY

Power-Alcohol Plant Now In Commercial Production

AMERICA'S first power alcohol plant is producing new fuel for motor cars. Two batches of anhydrous ethyl alcohol made from corn, totaling 2,000 gallons, have poured from the stills of the Chemical Foundation-sponsored plant of the Bailor Manufacturing Company, Atchison, Kansas.

Officials expressed themselves as pleased with the performance of the new plant and predicted that in a month the capacity of 10,000 gallons a day would be realized.

Alcohol-blended gasoline under the name of agrol will be on sale shortly in seven midwestern states at prices that will compete on a quality basis with straight gasoline fuels. The production of power alcohol from surplus farm products in this plant is being watched by leaders in agriculture, the oil industry and other fields, including government, because it is a practical demonstration of the Farm Chemurgic Council's thesis that crops from American soil can be utilized for manufacture of industrial materials.

The Atchison plant also produces butyl as well as ethyl alcohol and as a valuable by-product dries the spent mash into a protein feed for stock. The butyl alcohol is used in connection with the ethyl alcohol production.

The ethyl alcohol, the same stuff that gives the kick to liquor, is used blended with gasoline to produce motor fuel. The whole output of the Bailor plant is being taken by the Chemical Foundation of Kansas for distribution at a price not to exceed 25 cents a gallon.

At the plant the alcohol is denatured and then blended with an equal volume of a petroleum to make what is called "agrol fluid." This blend will be used by filling station operators to make three grades of agrol gasoline, known as agrol 5, agrol 10, and agrol 15. These numbers indicate the quantity of alcohol in each of the standard blends when 60 octane gasoline is taken as the base fuel. If the filling station uses higher octane gasoline, less agrol fluid is needed, and if lower octane gasoline is the base, more agrol fluid is blended.

The oil industry is quite naturally watching closely the operation of the new plant and the distribution experience. In an article in the current *Oil and Gas Journal,* W. T. Ziegenhain tells how the economies of power alcohol-gasoline blends will work out. The anti-knock value of base fuel, he explains, is raised one number for each one per cent of alcohol added to the 60 octane base fuel. Mr. Ziegenhain explains how an Omaha distributor might figure his relative cost. He pays 25 cents a gallon for the alcohol at the Atchison plant in the form of agrol fluid, and adds one cent freight charge. The present delivered cost of 60-octane refinery gasoline at Omaha is about seven and a quarter cents. If nine parts of this fuel are blended with one of alcohol, the resulting 70 octane blend costs nine and one-eighth cents. Regular 70-octane refinery gasoline is selling at Omaha for about eight and one-half cents. Large quantities of gum-solvent refinery gasoline is selling in the same area for one cent premium. The alcohol blend would fall in this classification and Mr. Ziegenhain believes that "the marketer might be attracted to the alcohol blend and the potential competition made real." The Atchison plant is believed by its officials to be the only commercial alcohol plant that has attempted to produce both butyl and ethyl alcohols and protein feed commercially in its initial operation.

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CHEMISTRY

Agriculture Department Studies Power Alcohol

MORE research upon the possibility of making power alcohol from farm products is being undertaken by the U. S. Department of Agriculture as the result of the Midwest's increasing interest in practical aspects of converting corn and other surplus or waste agricultural materials into stuff that will help run autos.

P. Burke Jacobs, formerly in charge of the Bureau of Chemistry and Soils' industrial farm products research laboratory at Ames, Iowa, is investigating intensively power alcohol production.

The new inquiry is a part of the general research on agricultural by-products being conducted by the Bureau of Chemistry and Soils.

Department of Agriculture scientists

are watching with interest the power alcohol plant built by the Chemical Foundation and the Farm Chemurgic Council at Atchison, Kans.

The making of motor fuel from crops grown on farms has been urged by the Farm Chemurgic Council movement. As a result there is wide support for this project in the agricultural sections, particularly in the corn states.

Both the policies of the U. S. Department of Agriculture and the Republican party are considered to be favorable to the continuation of intensive research of possible industrial use of farm products. Recently research possibilities compiled by the Farm Chemurgic Council were issued in a press release by Secretary of Agriculture Wallace.

The possibility that "new applications of alcohol, processed from the products of the soil, may increase the usefulness of the internal combustion engine" was mentioned by President Roosevelt in his recent World Power Conference address.

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CHEMISTRY

Dr. Bergius Defends Power Alcohol Popularity

DENYING that alcohol blended gasoline is losing favor in Germany, Dr. Friedrich Bergius predicts that "a proper blend of ethyl (grain) alcohol, methyl (wood) alcohol, benzene and gasoline bears promise of supplying the world with the ideal motor fuel for internal combustion engines."

Dangerous carbon monoxide in the exhaust gases would be reduced to the vanishing point by this properly blended fuel, Dr. Bergius contended in his statement issued by the Farm Chemurgic Council, protagonists for power alcohol made from farm products.

The Bergius opinion is considered a reply to a recent U. S. Bureau of Foreign and Domestic Commerce report that alcohol blended motor fuel was losing popularity in Germany. Dr. Bergius explained that the German situation with regard to farm products is now quite different from that in the United States and that there is a smaller surplus of potatoes and other starch and sugar crops from which power alcohol in Germany can be made. He does not expect synthetic gasoline made from coal by his process to conflict with power alcohol since 20 to 25 per cent, twice the amount now usually blended, could be utilized effectively in Germany if the alcohol were available.

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BIOLOGY

NATURE RAMBLINGS by Frank Thone

A Spoon For Each Dish

THE bewildering array of silverware that confronts you at a banquet has its counterparts in the natural world. Animal jaws, insect mouthparts, bird beaks are often even more specially adapted to one particular kind of food or drink than are the bouillon spoons, salad forks, or meat knives that lie in a glittering row on the table.

Parrots and their kin the parroquets, for example, have first-class fruit-knife beaks. They are largely fruit- and seed-eaters, and their tools are forged accordingly, with strong points to break through tough skins, and a broad, sharp blade on each side, for cutting.

Beaks of the meat-eating hawks and eagles are sometimes said to be like those of parrots, but the resemblance is only of the most general and superficial kind. They resemble the fruit-cutting kind of beak about as much as a steak-knife resembles a fruit-knife. And the beaks of their less fastidious cousins, the buzzards and vultures, being used only on carrion, need not be so sharply pointed or well whetted as are the highly developed flesh-hooks of the true birds of prey.

Beaks of birds like crane and stork, and on a smaller scale the snipes and sandpipers, are something between forks and forceps, for they can plunge into the dish to get their tidbit, but they pick it up by seizing it instead of spearing it.

Of spoon-like beaks there are a plenty, and they are used like spoons, too. Ducks are an outstanding example. They can "snobble" up grain from dry ground, as you might spoon popcorn out of a bowl, or they can go nuzzling along a pond bottom, scooping up worms, crayfish, plant tubers, and whatever other edible tidbits there may be in this natural "duck soup."

There are, of course, freak beaks, just as there are freak knives and forks and spoons. Nobody can imagine why such birds as the hornbill and the toucan should have received the doubtful blessings of oversized feeding organs. Nor why the spoon of the flamingo should have been so bent that the bird has to stand on its head and use its beak upside-down.

Omnivorous man, with his array of ingenious metal "beaks," can feed on a thousand things, but the birds, given only one feeding-utensil apiece, have to stick pretty much to one course all their lives. It is only the ones with the generalized beaks, like robins and barnyard hens, that can manage a highly varied diet, like unfashionable folk who have only a minimum of "eatin' tools."

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PALEONTOLOGY

African Ape Fossils Not So Old as First Thought

FURTHER details now available on the important great-ape fossil discovery in South Africa by Dr. R. Broom of the Transvaal Museum indicate that the skull is probably not as ancient as the Australopithecus fossils found twelve years ago in a different locality in South Africa, though it still belongs to the same genus or general group of primate animals (*See SNL,* Oct. 3).

In his report (*Nature,* Sept. 19), Dr. Broom states, "I think the Taungs deposit will probably prove to be Lower or Middle Pleistocene, while the Sterkfontein deposit is most probably Upper Pleistocene. I therefore think it advisable to place the new form in a distinct species, though provisionally it may be put in the same genus as the Taungs ape."

This means that both specimens are of animals that lived during the Ice Age, rather than before it—a difference in time of a million years at the very least. It also means that they lived after man had appeared. These particular specimens therefore could not have been a part of man's ancestry, though Dr. Broom regards Australopithecus as on or near the human line of descent.

The estimated size of the brain of the new specimen is 600 cubic centimeters, considerably larger than that of the average gorilla. The average white man's brain measures about 1,400 cubic centimeters, and the smallest normal human brain was about 1,100 cc.

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