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NEED MORE DEFINITE KNOWLEDGE OF HIGHWAY PROBLEMS

(By Science Service)

Washington, August .- More definite knowledge of the engineering and economic facts should control the construction and use of highways and vehicles is needed to assure proper future progress of highway transportation in this country, declares Prof. W. K. Hatt, just appointed director of the advisory board onhighway research of the division of engineering of the National Research Council. This board will coordinate and suggest needed research that can be carried out by the leading national organizations that are concerned with the construction, economics, and maintneance and financing of roads and vehicles.

"The situation is critical", says Prof. Hatt. "The sconor those interosted use facts as the basis for their activities, the more assurance we shall have that the public will not interrupt progress in highway transport because of a general feeling of insecurity".

Approximate figures available now from the industry indicate that the annual expenditure on the automobiles and trucks that run over the roads is twelve times as large as the amount of money spent each year on the roads themselves. For this reason, Prof. Hatt and his committee believe that the facts that affect the cost of vehicle operation due to the road surface and the vehicle itself must be emphasized, and that while in the past most effort has been spent in road building. the future must see intensive research effort to make the automobile more efficient and cause the road to have a longer life by proper maintenance.

"There are \$10,000,000 invested in self-propelled vehicles, and the turnover is over \$3,000,000,000 annually", says Prof. Hatt. "For every ten passenger vehicles there is one freight vehicle, and the problems of speed and safety are very important. Transportation by self-propelled vehicles is the most expensive of all connercial forms, and the future will see a large increase in the volume of this type of transportation".

Cooperating in the National Research Council in the broad work of coordinating highway research are the various state highway officials, the American Concrete Institute, the national organizations of consulting engineers, civil engineers, mechanical engineers, and automotive engineers, the American Society for Municipal Improvements, the A merican Society for Testing Materials, the Association of American State Geologists, the U. S. Bureau of Public Roads, the Corps of Engineers of the U.S. Army, the Engineering Foundation, the Federal Highway Council, the National A utomobile Chamber of Commerce, and the National Highway Traffic Association.

The new organization will not engage in research itself, but will act as a helpful and suggestive clearing house for the facts arrived at as a result of the large amount of highway research that is in progress and planned by the Bureau of Public Roads, the U.S. Army, the state highway cormissions, the universities and industrial organizations all over the country.

SCIENCE CONCOCTS NEW BEVERAGE FROM AMERICAN VEED

(By Science Service)

Applying scientific methods of tea manufacture to the curing of a wild weed of the South Atlantic States and devising a special system of preparing the delicious beverage for human consumption, George F. Mitchell, tea specialist of the U.S. Department of Agriculture has rendered available a new, stimulating, native and national drink which is purely American and which, potentially, promises to be the cheapest beverage used in our dietary. Mr. Mitchell is not the discoverer of the new drink -- the primitive Indians and early settlers in the Carolinas, Georgia and Florida ascertained the stimulating properties of the native cassina plant which is a most prolific and profusely growing weed, which occurs on even the poorest soils of the section under discussion -- but he has accurately appraised its connercial possibilities, and after intensive effort he has devised ways and means of curing the cassina leaves and converting them into a mild and soothing beverage which is as rich as coffee in caffeine content and is practically free of the obnoxious tannin which makes tea objectionable to many consumers.

The cassina plants are very abundant in sections of Texas, Alabana, Mississippi, Georgia, Florida, the Carolinas and Virginia, attaining a height of from 15 to 20 feet. Cassina plants are frequently used for hedge purposes, under which conditions they often grow 18 to 20 feet wide and several miles long. A

All the leaves of the bushes can be used for making the new drink. This is an outstanding feature which adapts the cassina plant for beverage manufacture, inasnuch as the cutting and curing of the leaves are simplified and not expensive hand-labor operations as in the case of the tea leaf harvest. About two decades ago Uncle San acclimated and adapted many varieties of tea to cultural conditions in South Carolina, but his representatives were unable to produce the tea satisfactorily on a conmercial scale due to the fact that the choice, tender leaves and buds of the tea plants have to be cut by hand, making the cost of harvest labor excessive.

This impediment to the development of a connercial industry will not handicap the cassina beverage project because mechanical harvesters can be used to expedite cutting.

A t present large anounts of wild cassina are available as waste weeds on abandoned land which could be profitably harvested and cured for beverage purposes. Wr. Mitchell purposes to continue his investigations and to attempt to breed and cross-breed varieties of the wild cassina which are richest in caffeine so that ultimately he can specialize in the production of these superior strains under painstaking conditions of proper cultivation and care. He has worked out practical methods of curing and processing the cassina like tea, adapting labor-saving tea machinery to these operations. He makes the drink exactly like coffee by either boiling for 3 minutes or percolating for 5 minutes. All tea and beverage experts who have sampled the new drink have declared it the equal or superior of tea and coffee in either the hot or the iced form. It is anticipated that the connercialization of the cassina plant as a beverage base will not conflict with the existent tea and coffee business as there is also room on our national menu for another drink -- particularly one of the made-in-America type.

LONDON INSTITUTE TELLS BEST VOCATION AND HOW TO BE HAPPY

(By Science Service)

An institute of applied psychology has been established in London under Scientific auspices to help people realize their two principal aims in life: to Succeed in their vocations and to be happy in their social life. "The pillars upon Which success in life is built are mental ability, temperament, personality and character", declares Dr. Morley Dainow, director of the new project. "Mental ability gives you knowledge and power. Emotional control makes you fit. Personality compels attention and interest. But progress cannot become permanent without character, which is the moral self, the result of your actions. The essentials in character are ideals and moral courage." By Dr. Harlow Shapley, Mount Wilson Observatory.

(Science Service)

The stellar universe, as we know it, appears to be a very oblate spheroid or ellipsoid -- a disk-shaped system composed mainly of stars and nebulae. The solar system is not far from the middle plane of this flattened organization which we call the galactic system. Looking away from the plane we see relatively few stars; looking along the plane, through a great depth of starpopula ted space, we see great numbers of sidereal objects constituting the bandd of light we call the Milky Way. The loosely organized star clusters, such as the Pleiades, the diffuse nebulae such as the great nebula of Orion, the planetary nebulae; of which the ring in Lyra is a good example, the dark nebulosities -all these sidereal types appear to be a part of the great galactic system, and they lie almost exclusively along the plane of the Milky Way. The globular clusters, though not in the Milky Way, are also affiliated with the galactic system; the spiral nebulae appear to be distant objects mainly if not entirely outside the most populous parts of the galactic region.

This conception of the galactic system, as a flattened, watch-shaped organization of stars and nebulae, with globular clusters and spiral nebulae as external objects, is pretty generally agreed upon by students of the subject; but in the matter of the distances of the various sidereal objects -- the size of the galactic system -- there are widely divergent opinions. Let us consider briefly the dimensions of that part of the stellar universe concerning which there is essential unanimity of opinion.

Possibly the most convenient way of illustrating the scale of the sidereal universe is in terms of our measuring rods, going from terrestrial units to those of stellar systems. On the earth's surface we express distances in units such as inches, feet, or miles. On the moon the mile is still a usable measuring unit.

Our measuring scale must be greatly increased, however, when we consider the dimensions of a star -- distances on the surface of our sun, for example. The large sun-spots cannot be measured conveniently in units appropriate to earthly distance -- in fact, the whole earth itself is none too large. The unit for measuring the distances from the sun to its attendant planets is, however, 12,000 times the diameter of the earth; it is the so-called astronomical unit, the average distance from earth to sun. This unit, 93,000,000 miles in length, is ample for the distances of planets and comets. It would probably suffice to measure the distances of whatever planets and comets there may be in the vicinity of other stars; but it, in turn, becomes cumbersome in expressing the distances from one star to another, for some of them are hundreds of millions, even a thousand million, astronomical units away.

This leads us to abandon the astronomical unit and to introduce the light-year as a measure for sounding the depth of stellar space. The distance light travels in a year is something less than six million million miles. The distance from the earth to the sun is, in these units, eight light-minutes. The distance to the moon is 1.2 light-seconds. In some phases of our astronomical problems (studying photographs of stellar spectra) we make direct microscopic measures of a ten-thousandth of an inch; and indirectly we measure changes in the wave-length of light a million times smaller than this; in discussing the arrangemount of globular clusters in space, we must measure a hundred thousand light-year hupressing these large and small measures with reference to the velocity of light. we have an illustration of the scale of the astronomer's universe -- his measures range from the trillionth of a billionth part of one light-second, to more than a thousand light-centuries. The ratio of the greatest measure to the smallest is as 1,000,000,000,000,000,000,000,000,000 to 1.

Light plays an all-important role in the study of the universe; we know the physics and chemistry of stars only through their light, and their distance from us we express by means of the velocity of light. The light-year, moreover, has a 0

double value in sidereal exploration; it is geometrical, as we have seen, and it is historical. It tells us not only how far away an object is, but also how long ago the light we examine was started on its way. You do not see the sun where it is, but where it was eight minutes ago. You do not see faint stars of the Milky Way as they are now, but more probably as they were when the pyramids of Egypt were being built; and the ancient Egyptians saw them as they were at a time still more remote. We are, therefore, chronologically far behind events when we study conditions or dynamical behavior in remote stellar systems; the motions, light-emissions, and variations now investigated in the Hercules cluster are not contemporary, but, if my value of the distance is correct, they are the phenomena of 36,000 years ago.' The great age of these incoming pulses of radiant energy is, however, no disadvantage; in fact, their antiquity has been turned to good purpose in testing the speed of stellar evolution, in indicating the enormous ages of stars, in suggesting the vast extent of the universe in time as well as in space.

TALED BLUEBERRY MAY BE GREAT AMERICAN CROP

(By Science Service)

The blueberry, taned and improved by science, and planted in the "worthless" peat soil that it likes, has a chance to become one of the important crops of America. Altepresent the fruit on the market is almost without exception wild.

Perhaps the delicate flavor of the blueberry has led you to trace it to its native haunts and, with visions of numerous pies, you have transferred the plants to your own garden, only to see them make a brave but losing struggle and at last die. You have so successfully treated other wild berries in the same way you wonder what is the cause of your failure with this variety. In this case, as often, science has come to your aid, for through a series of experiments Dr. Frederick V. Coville of the U.S. Department of Agriculture has demonstrated that your garden, with its rich mineral soil, is not the place for blueberries, and if you would grow them you must plant them in an acid or sour soil. Best of all, is the poorly decayed acid soil known as peat.

Now that the soil requirements have been learned, progress is being made in blueberry cultivation. By selecting the largest, handsomest and best flavored wild strains, experimenters have greatly increased the yield and produced a far more palatable fruit, very much larger than the wild fruit on the market. Instead of the graft, which is usually used but is unsuccessful with the blueberry, cuttings are employed for propagation.

A natural blueberry bog near Elkhart, Indiana was the first commercial blueberry plantation. This was prepared in 1889 by clearing out other plants and giving the blueberries a chance to grow. The net profits ranged from \$10 per acre, in a year when frost almost destroyed the crop, to \$147 per acre, in a very favorable year.

If a number of acres of our so-called worthless peat soil is planted in blueberries, the next few years will see a marked increase in the production and improvement in the quality of this fruit.

HALF CENTURY PLANTS

(By Science Service)

There are no true century plants in the sense that it takes them a hundred years to bloom. A number of plants, however, do not bloom until they have lived for a long term of years. The classic example of such plants is the talipot alm of India which lives for fifty years or more and becomes a tall tree before it blooms. After it has sent up its immense flower-stalk the whole plant dies. Our American "contury plants" often fruit at the end of eight or ten years under natural conditions, but in the house may refuse to bloom at all. Many of the bamboos act like the century plants and bloom but once after a long period of vegetation. Such species are known as nonocarpic plants. (Editors: This is a batch of short paragraphs that will come to you in Each number of the Bulletin. They will provide either a daily feature or a good supply of fillers.)

DO YOU KNOW THAT-

Daring vulcanologists frequently descend into the crater of Vesuvius to take photographs, measure temperatures and collect specimens of volcanic material.

Oysters from the eastern coast of the United States have been carried to Hawaii alive and planted in Pearl Harbor.

A tortoise belonging to a South African Museum, which died in 1920, had been under observation since 1834, when it was already of gigantic size and of unknown age. A female tortoise belonging to the same nuseum has been known since 1843. It still lays eggs.

Rats on the coast of New Guinea fish for crabs by dangling their tails in the water (unless we have been basely deceived by Captain A. W. Monckton, F.R.G.S., author of "Some Experiences of a New Guinea Resident Magistrate".)

DO WOU KNOW THAT-The best substitute for coffee yet discovered is said to be made from the seeds of Astragalus boeticus. This is known in Europe as Swedish coffee.

The name "daddy longlegs" is applied in the United States to creatures closely related to spiders, while in England it is given to the crane flies.

Waves breaking on the breakwater at Alderney, Channel Islands, have been known to throw water as high as 200 feet.

Thw delusion of the "old-fashioned winter" has prevailed in this country ever since colonial times. Many writers of the eighteenth century speak confidently of a marked "change of climate" within their personal recollection and dwell especially on the heavy snows and unlimited sleighing of their boyhood days.

DO YOU KNOW-THAT-

One shot from a 14-inch gun possesses as much energy as a volley from 60,000 muskets.

The dried and pulverized bodies of "blister beetles" produce a blistering effect on the skin and are used to make blister plasters. The species most often used for this purpose is the cantharia, or Spanish fly.

The largest known moteorite was found by Peary in Greenland and brought by him to New York, where it now is. It weighs 362 tons.

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Graham flour derives its name from Sylvester Graham, a Connecticut clergyman, who advocated the use of unbolted wheat flour as more conducive to health than white flour. His contentions have been fully berne out by recent discoveries in regard to vitamines. Much of the so-called Graham flour sold now is, however, merely white flour mixed with a little bran, or flour so coarsely ground as to be unpalatable.

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DO YOU KNOW THAT-

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One of the star-names given to Arabian horses in "Ben Hur" is Mira. This name was introduced into astronomy about sixteen centuries after the period of the story.

The Glastonbury thorn, a variety of hawthorn, is remarkable for its early flowering. In England it often blossons in midwinter.

No sunlight penetrates to the deepest parts of the ocean. Deep-sea creatures that have eyes (as many have not) probably catch their prey by the phosphorescent light shed from their bodies and from the bodies of innumerable other denizens of the deep.

The standard for button measurement both in England and this country is a "line", or one-fortieth of an inch. This is not the same as the French "ligne", ll¹/₄ of which are needed to make an inch, which is used in measuring ribbons even in this country.

DO YOU KNOW THAT-

Petroleum tank cars made of reinforced concrete are being run regularly on several French railways. In a test, a car was run against a standard railway bumper, with the effect of wrecking the latter without damaging the concrete tank.

There have been 28 eruptions of Mount Hecla, the famous Iceland volcano, since the discovery of the island.

The adoption of the Grogorian calendar in England in 1752 led to violent riots, especially at Bristol, where several people were killed.

Crawfish do great damage to young cotton plants in certain districts adjoining the Mississippi. The planters partly offset their losses by feeding boiled crawfish, mixed with meal, to poultry, whose egg-production is said to be much indreased by this diet.

DO YOU KNOW THAT-

Whether insects have the sense of hearing is an unsettled question.

The powerful gust of wind from an abroplane propeller is used by motion picture producers to create initation snowstorms, sand storms, forest fires, etc. Under this formidable blast trees bend, leaves quiver and the fury of the storm is depicted with startling realism.

The grains of sand found on the seashore average about .Ol inch in diameter. When the grains are more than twice this size the sand is regarded as "coarse".

Beach-la-mar is a curious jargon which has developed as a means of communication between English-speaking traders and the islanders of the western Pacific. It derives its name from that of an edible marine organism, the fishing of which flourished in the South Seas in the middle of the last century. Nearly all the words in this language are English, but they are strung together by the natives in accordance with the rules of their own speech.