SCIENCE NEWS

Science Service, Washington, D. C.

PREVIEWS INTO THE FUTURE OF SCIENCE

PEERING into the next century, industrialists and scientists have attempted to predict the forthcoming accomplishments of pure and applied science.

These forecasts were made in connection with the "Jules Verne" survey of industrial progress in the next century arranged by General Motors Corporation simultaneously with the opening of the second summer of the Century of Progress exposition in Chicago.

Among the previews obtained were:

FUTURE OF MAN

"The average life of mankind in the time of Queen Elizabeth was twenty years. To-day the average is fifty-eight years for man and sixty-one for woman, who is biologically more important. . . . Recent discoveries in medicine are leading to astonishing results, and give a prospect that the life of man will soon reach the Biblical promise of three score and ten."—Drs. W. J. and C. H. Mayo, of Mayo Clinic, Rochester, Minn.

"We are on the threshold of advances in biology generally, and particularly human biology, that will fundamentally alter our outlook. . . . Already we know how in the laboratory to increase the power of lower organisms to utilize their available resources in food material and energy for vital processes, such as growth and duration of life from three to ten times over their usual performance with corresponding relative increases in size, longevity, and so forth. . . . Developments and applications along these lines are likely to come in the not too distant future."—Dr. Raymond Pearl, The Johns Hopkins University.

"Biologically speaking it is fair to say that man's social progress is now only at its beginning and that the two million years that separate us from the cave-man mark only the start of human life. The progress of the next two million years is as inevitable as that of the last, and when we have reached this new goal such events as the present depression will have vanished beyond recognition."—Dr. G. H. Parker, president, American Academy of Arts and Sciences.

"The next century should see an extension in the conquest of science over the forces of nature so astounding that imagination is inadequate to conceive of the final result. In the field of organic chemistry our knowledge of the vital chemical processes of living matter will be so enormously increased that it is not too much to say that the life cycle itself may be controlled to the end that old age shall have disappeared and that many then alive may live to ages rivalling that of Methuselah."—Thomas Midgley, Jr., vice-president, Ethyl Gasoline Corporation.

FUTURE OF RESEARCH

"The material world is so infinite in its variety that I am convinced modern science, modern inventions and modern methods of mass production have only scratched the surface. The inventions which we have seen so far are only a foretaste of what is to come, provided only the spirit of man is pointed in the right direction and we are able to experiment in the field of social science in as scientific and good-natured a way as we experiment in the field of physical science."—H. A. Wallace, Secretary of Agriculture.

"Scientific invention must continue but social invention must provide an efficient distribution of wealth to supply buying power adequate to the flow of mass production."—Charles A. Beard, Author.

"Available work can be continually expanded and progressively higher standards of living made possible through developments of science and industrial research. At the same time in my opinion if the utmost is to be achieved there must be equal development of social consciousness on the part of leaders in science and industry. Planning on a national scale with a view to making this a land of comfortable, efficient, attractive homes would seem to be indicated with every industry cooperating in that definite purpose rather than each working independently and sometimes at cross purposes."—Lowell Mellett, editor, Washington, D. C., *Daily News*.

"It is of the utmost importance to society that research in pure and applied science be speeded up to improve the methods of industry and its products and to create new processes or products that man will desire to possess and which therefore may create new industries."—C. R. Richards, president, Lehigh University.

"We believe America's inventiveness is little more than started. With seventeen hundred industrial research laboratories in operation compared with two hundred twenty years ago, no other conclusion is justified."—C. M. Chester, president, General Foods Corporation.

FUTURE OF MATERIALS

"The more systematic application of the scientific method to the art of steel making and the development of more fundamental knowledge of the wonderful properties inherent in iron and its alloys is going to lead to a picture and a control of the molecular architecture of steels which will enable the user to choose that steel which is really best for his particular purpose, to improved steels of many kinds, to steels which will better satisfy the insistent demands of many diverse industries for a metal which will be satisfactory under continually severer conditions of service. This will result in the lightening, indeed in the redesign, of many structures and machines with economic advantages so great as to bring about a large amount of reconstruction."—John Johnston, director of research, U. S. Steel Corporation.

"Rail tires of no less than three types are ready for a coming market. An astonishing new safety device for automobiles is in the making. The major line of balloon tires has undergone a radical change resulting in much longer non-skid life."—B. Darrow, development manager, Goodyear Tire and Rubber Company.

"Rapid progress in the methods of manufacture, of improvement of quality and of methods of fabrication of sheet metal is making tremendous contributions to human welfare. Sheets for forming operations are offering homes of greater comfort and at greatly reduced cost. The application of sheet metal for pressed steel porcelain sanitary ware, such as sinks and wash basins, is making sanitary facilities of beauty available at only a fraction of former costs. The development of refrigeration and air conditioning is making healthful conditions of living available to a greater percentage of the people."—Dr. Anson Hayes, director of Research Laboratories, American Rolling Mill Company.

"Carpet making from all modern raw materials filling carefully analyzed functional requirements will replace traditional textile materials fabricated in imitation of old world craftsmanship. Rubber pyroxylin and resins are already accepted as logical carpet materials, in addition to conventional hair and vegetable fibers. Carpets will be utilized not only for adornment but because of acoustical and thermal properties as well."—G. E. Hopkins, technical director, Bigelow Sanford Carpet Company.

"Incandescent lamps of improved design resulting in higher electrical efficiencies promise savings in current consumption. Ultra-violet lamps and sources of the lower wave-length radiation offer new possibilities to this general field. Further, the development of the new gaseous vapor discharge lamps, including the sodium lamp and the high pressure mercury lamp, promise new offerings in electrical efficiency and the character of lighting."—A. M. Hageman, manager research staff, Westinghouse Lamp Company.

"We are just beginning to enter the age of alloys and much more is to be expected in improved physical properties and resistance to destruction by corrosion. Welding precipitation, hardening, also heat treatment and methods of manipulation are only beginning to be understood. New materials are promised for commercial use."—William H. Bassett, research staff, American Brass Company.

"Science has shown us how to duplicate almost all the important petroleum products by chemical treatment of the almost inexhaustible supplies of shale and coal. While such processes are not economically feasible in this country at present, they certainly will become so long before our oil reserves are fully exhausted, so that a civilization based so largely on oil heat and oil power need have no fear for its basic supplies."—E. G. Seubert, president, Standard Oil Company of Indiana.

"The greatest future development in the oxy-acetylene industry will probably be in flame machining. Applying an oxy-acetylene torch to a steel cylinder, it is possible to make a cut corresponding to a machine tool cut ½" deep with a 2" feed at a peripheral speed of 10 ft./min. and the power required for the rotation of the steel being cut may be a fractional horsepower motor."—John J. Crowe, engineer, Air Reduction Sales Company.

"I can visualize the products of the orchard and field of Turkestan or California served in London ten years thence with all the native freshness and taste of those freshly gathered. This means suspended animation of both enzymes and organized microorganisms. Not less interesting and romantic will be the container for these foods which I visualize as nonmetallic, transparent and nonbreakable."—Charles S. Ash, director of research, California Packing Corporation.

"Strong aluminum alloys will permit construction of more and better bridges for the taxpayer's dollar and further aluminization of automobile engines would improve efficiency and comfort in motoring."—F. C. Frary, research staff, Aluminum Company of America.

"More than any other human activity, our country's metallurgical, chemical, physical and social laboratories will enable us to satisfy those needs not yet realized and will continue to create more and better jobs by improving our transportation, housing and recreational facilities."—W. B. Lashar, Jr., director of research, American Chain Company.

"No science has progressed faster than chemistry and the one inexhaustible source of chemical raw material is the farm. More and more the chemist is showing the way toward increased markets for agricultural products. This was unknown fifteen years ago. To-day in a small way it is being done. To-morrow it should be a reality."—F. N. Peters, director furfural laboratory, Quaker Oats Company.

"Progress in cellulose chemistry is just beginning to strike its stride. The rayon, cellulose and film industries are only a beginning of new industries based upon cellulose as a raw material. Pulp and paper will continue to become more and more important in this next century of advanced civilization."—Bjarne Johnson, director research staff, Hammerhill Paper Company.

"In the future, metal will be removed from hard materials by new types of abrasive wheels and new methods at rates comparable with the rate at which stock is removed from softer metals by milling machines to-day. The grinding of pulp by artificial abrasives will be so controlled that use of chemical processes will not be necessary to produce strong paper. New, harder and tougher cutting materials will revolutionize the grinding industry and invade the field held by cutting tools, such as carboloy and stellite. Smoothness and accuracy of finish is advancing rapidly, with consequent decrease in the wear of moving parts. The life, efficiency and range of action of synthetic resin bonded abrasives will be almost indefinitely increased due to application of new resins and methods of manufacturing."—R. C. Benner, director research and patent staff, Carborundum Company.

"Ophthalmic optical development to improve the vision of mankind has by no means reached its end. New optical glasses will be developed in the future which will give optical designers a chance to improve existing optical instruments."—Carl L. Bausch, manager research and engineering, Bausch and Lomb Optical Company.

"Recent developments in rubber which will undoubtedly expand are the manufacture of elastic fabrics, the application of rubber to automobile and other mechanical engineering problems to absorb vibration, the protection of chemical engineering materials against corrosion and

many others.''—W. A. Gibbons, director of development, U. S. Rubber Company.

FUTURE OF TRANSPORT

''Tires of the future will be larger, softer and safer, running on immeasurably less air pressure.''—W. O'Neil, president, General Tire and Rubber Company.

''We are looking forward to putting all transportation on rubber-tired wheels, from the roughtest farm implement on through a greatly increased highway freight expansion, and even to rubber-tired wheels on lightweight, high-speed rail vehicles. We believe also that we are on the eve of high-speed commercial transport overseas with large rigid airships.''—P. W. Litchfield, president, Goodyear Tire and Rubber Company.

''Road-building costs will be so reduced by scientific improvements in Diesel track type tractors and allied equipment that all the inaccessible parts of our country will have the blessing and comfort of perfect highways for automotive transportation. The building of dams and levees, the digging of irrigation canals and ditches will be done so easily and cheaply that no one need farm stony, barren and unproductive soil, but will have available the fine fertile unused lands of this country that require only water and tillage to produce the crops that will be needed by highly paid skilled workmen.''—Oscar L. Starr, vice-president in charge of research division, Caterpillar Tractor Company.

''Decentralization is undoubtedly the requisite for higher standards of living and a concomitant to decentralization is better transportation.''—W. C. Hamilton, research director, American Steel Foundries.

FUTURE OF BUILDINGS

''We have had a large group working for four years to produce a cheap but modern house for the masses. A five-room house equipped with every article of furniture, linens, rugs, kitchen utensils, in a word, everything together with a garage and the lot with all improvements such as sewers, pavement, sidewalks, lawns, trees can be sold to the workingman for two thousand dollars, allowing adequate profit to the manufacturer, adequate time financing cost and every other similar type of expense.''—L. R. Smith, president, A. O. Smith Corporation.

''We are on the eve of a great development of refrigeration both in air conditioning of railroad cars, theaters, restaurants and private dwellings and refrigeration of foods.''—E. C. Van Diest, president, General Service Corporation.

''The office building in the future will be a shell structure only, and interiors may be made available to tenants quickly and economically, and designed to suit their own particular needs. As one step in our own research program in this field, we put on the market about a year ago a new type of partition structure made from prefabricated units, which, combined with ceiling and floor units that we already had available, provide a complete interior shell for office buildings.''—William R. Seigle, chairman, Johns Manville Corporation.

''It is not unreasonable to expect the future to give us any desired comfort in the home at a cost within the reach of the majority and any desired food regardless of location or season of the year.''—Wm. R. Hainsworth, director of engineering, Servel, Inc.

''Through the development of new and better devices in transportation, air conditioning, industrial processes, home applications and improvements in public health, we can expect in the next few years great improvements, the creation of new industries and new jobs through the commercialization of new scientific knowledge, which is now being obtained faster than ever before.''—L. W. Chubb, director research laboratories, Westinghouse Electric and Manufacturing Company.

FUTURE OF COMMUNICATION

''Lithography and printing can now be appreciated only through the medium of vision. With certain modifications they can conceivably be made to appeal to the auditory sense as well.''—Robert F. Reed, department of lithographic research, University of Cincinnati.

''New avenues of approach to the use of ultra short waves have recently been opened. Multiplex transmission sending three different radiograms simultaneously on the same wave-length will be utilized in the new domestic radio telegraph service of RCA. High speed radio facsimile gives promise of a new method of reproducing messages in their original form instead of by coded dots and dashes.''—David Sarnoff, president, Radio Corporation of America.

''New developments will give us pictures in real color, stereoscopic in character, and with sound practically as faithful as the original.''—E. H. Hansen, director of sound recording, Fox Film Corporation.

ITEMS

A VERITABLE porcupine of the sea, a giant sea urchin with spines a foot long, has been given scientific description for the first time by Austin H. Clark, curator of echinoderms at the U. S. National Museum. The creature is believed to be the biggest sea urchin known from any part of the Atlantic Ocean. The giant sea urchin was discovered by Dr. P. Powers, of the Carnegie Institution of Washington, in the shallow waters around the Dry Tortugas Islands. Its round body is about six inches in diameter. It is covered with hundreds of foot-long, barbed black spines. Among their bases are about 200 bright blue eye-spots arranged in rows. These appear to be true sight organs, for when anything moves in front of them the long spines are kept pointed menacingly at it.

PEOPLE susceptible to hay fever who owe their suffering to the ragweed pollens should keep away from insecticides made from pyrethrum, according to Dr. Samuel M. Feinberg, speaking before the American Medical Association at Chicago. Among the common household insecticides of this kind he mentioned Black Flag and Flit. Out of 225 persons who start sneezing when the late summer breezes blow ragweed pollen about, skin tests showed that 104 were sensitive to commercial pyrethrum. Insect powders and sprays containing pyrethrum may bring on attacks of hay fever in these persons outside the ragweed season.