SCIENCE NEWS

CHEMISTRY AT LOS ANGELES

By Professor G. Ross Robertson

Science Service Correspondent

Pectin, the mysterious chemical that puts the "jell" in jelly, is the latest product credited to the homely lemon. American Chemical Society delegates were told at their annual convention at Los Angeles of processes by which the fruit is worked up almost as thoroughly as a hog in the Chicago stockyards.

Already enormous quantities of superfluous lemons, collected from the whole southwest when the market is dull, are now being converted into citric acid and lemon oil at Corona, Calif. Now comes the white rag of the peel with its contribution of a potent jelly-forming principle. This appears as a dry gray powder, ready to aid the housewife in compelling a rebellious fruit juice to jell.

Formal commercial standards were advocated by C. P. Wilson and associates. Hitherto pectin has been marketed in the form of a crude fruit extract carrying with it the original flavor of the fruit used in manufacture. Such pectin is attractive to the jelly-maker who wishes to prepare the same flavored jelly, but is ill adapted to a jelly of special delicate flavor other than that of pectin preparation. The new dry lemon pectin, running as high as 90 per cent. of the essential jelly principle, carries no confusing flavor. It requires no fruit juice to prepare a jelly from lemon pectin. Sugar, acid, water and pectin are the sole necessities. None of these four may be omitted, else the jelly will not jell, but flavors may be added at will.

Dr. W. H. Dore, pectin chemist, holds scant hope of artificial synthesis of the jelly principle, on account of the extraordinary complexity of its chemical make-up.

That scientists should keep out of the evolution controversy is the opinion of Dr. R. A. Millikan, world-famed physicist, and his statement has been endorsed by leading members of the American Chemical Society. Dr. Millikan's counsel given at the chemical conclave is by no means to be taken as a weakness of the scientists' position in the mooted issue of freedom of thought. Rather it is a clear-cut statement that the business of the scientists is to draw conclusions from facts. The confusion of speculation with scientific fact, Dr. Millikan said, is obscuring truth and creating needlessly a host of enemies of science.

Visiting chemists score the recent public indictments of the scientist in which he is accused of trying to undermine religion and promote atheism. College professors in science are in the business of collecting, organizing and teaching facts, and have no obligation to preach any brand of religion or philosophy any more than the specialist in plumbing or music. There is no disposition here to oppose the introduction of religious instruction in the schools, provided there can be a universal agreement on the plan. This is, however, not the job of the chemistry professor.

Following the concluding session the chemical society *en masse* ascended Mt. Wilson and viewed the heavens through the monster instruments of the solar observatory. In some ways the feature trip of the national meeting was the final excursion to Trona, Calif., where on the Mohave Desert is located the Verdun fortress of the American potash industry. After seven years' battle against terrific odds, only this one potash enterprise survives on American soil. According to Dr. R. W. Mumford, potash expert at the convention, Searles Lake at Trona, with a deposit of potash-bearing salts seventy-five feet thick and twelve square miles in area, could meet the demands of the whole United States even if the nation could be blockaded for a hundred years.

Warnings against chemical poisons in bootleg liquor were given.

Nearly 10 per cent. of the illicit distilled liquor captured in Massachusetts contains poisonous copper compounds, according to Miss Blanche D. Berry, Boston chemist. The liquor vapors attack the copper tubing used in moonshine operations and carry the material through into the finished product. It is presumed by chemists that acetic and butyric acids, caused by misdirected fermentation of impure mashes, form verdegris and like poisons from the copper. The local prohibition office reports similar trouble from lead in the solder used by illicit distillers in the construction of their apparatus. In extreme cases common pipe galvanized with zinc is employed, said to be giving rise to so-called "galvanic poisoning" which is being encountered by the police.

The industrial chemical laboratory may apply fundamental principles, but it is the poorly paid academic genius who is likely any day to upset a whole manufacturing industry by some unexpected discovery, Dr. James F. Norris, noted organic chemist of the Massachusetts Institute of Technology, said in his annual presidential address to the American Chemical Society.

The college professor can not ply his research in the industrial laboratory, according to Dr. Norris. He would be discharged in six months when the stockholders found he had not made an impression on the current dividends. There must be no commercial check on the performance of the university investigator. Criticizing the present-day American chemistry professor for his aloofness from industry, President Norris urged his fellow professionals at least to choose their problems from the domain of the practical world. Once chosen, the program of research must be left to unfold free and unfettered by ties to the dollar mark.

Any chemical on earth, continued Dr. Norris, if reduced sufficiently in price, will find a use in the every-day world. Hundreds of thousands of chemical substances now already known but still unused cost at present more than their weight in gold. This fascinating array of material lies open before the rising young chemist, ripe for some revolutionary application.

President Norris ridiculed the idea that the mastery of coal tar and its wonderful drugs and dyes was an easier task than the mastery of petroleum, not yet accomplished. The petroleum companies must broaden their interest beyond the domain of gasoline and lubricants, and with large financial support penetrate the vast unknown of the chemistry of oil.

The intensely sweet sugar, levulose, will soon come to the rescue of glucose candy, Dr. Herman Spoehr, carbohydrate expert of the Carmel, Cal., laboratory of the Carnegie Institution, predicted. Sweetmeats made of glucose or common commercial corn syrup alone do not satisfy the American tooth, although they have the smooth texture so desirable in fancy modern confections. They simply are not sweet enough. Fortified with the new commercial levulose it is expected that glucose candy will move up into the saccharine aristocracy at the front sales counters. Other reports indicate that all clouds on the reputation of glucose have been removed by the latest purification of the product until it is now a 99.85 per cent. sugar of snowy crystalline beauty.

Dr. Leroy S. Weatherby, organic chemist of the University of Southern California, told the national convention how a new dahlia and artichoke industry promises new life for domestic sugar manufacturers. At present huge beet sugar plants are lying idle two thirds of the year for lack of raw material. It is now expected that after producing beet sugar in the summer, the plants will run four months on artichokes, followed by four months on dahlia tubers to produce large quantities of the new levulose sugar. At present levulose is prepared only as a syrup or moist powder-like brown sugar, but the problems of crystallization are rapidly being solved commercially.

The popular idea of levulose as a panacea for diabetes is seriously questioned by Dr. J. W. E. Glattfeld, research sugar expert of the University of Chicago. While the new sweetener is more rapidly digested and at first seems to be tolerated better than common sugar, the toleration soon ends when the diabetic internal organs start chemically converting levulose into glucose, the very material they can not endure. The only assured value of levulose in diabetes is in the possibility of sweetening the patients' food with only half the quantity of sugar customarily used when common cane sugar is on the table.

An explosive so violent that it drove the pieces of its container shot-hole fashion clear through a near-by bottle without cracking the bottle was described by Father J. A. Nieuwland.

The new substance is divinyl acetylene, product of remarkable new developments in acetylene chemistry at Notre Dame University. As usual, dyes and explosives are bed-fellows in this research, and a brilliant new scarlet color is one of the results of combining acetylene with coal-tar derivatives. This is the first serious and extensive use of acetylene in chemical synthesis, the gas having heretofore been relegated to the domain of the steel-welder.

If you feed on white corn bread alone and want to live long and happily, don't fail to lay the butter on thick. Experiments of J. H. Hansbrough and associates reported to the chemists show that a rat's life is sixty days on a white corn diet but just five per cent. addition of clear filtered butter fat adds at least five months to its life. Late bulletins show the butter-eaters still alive, happy and apparently still only middle aged. Vitamin A, the mysterious chemical disease-preventive of butter, seems here to be the key to longevity.

The question is still open whether vitamin A will add years to the life of a human being, although scientists are finding a remarkable correspondence between the internal life habits of man and the rodent.

Cod liver oil, the food which saved the war-cursed children of the Balkans from death by shortage of vitamin A, is not always a satisfactory source of the mysterious life-giving chemical, V. E. Nelson told the chemists. New methods of inspection and test are needed and not yet available for rejection of useless oil whose deceptive appearance gives no clue of its value.

Pseudo chemistry is a symptom of a new kind of mild insanity described by Dr. Frank C. Whitmore, new chemical chief in Northwestern University. This discussion is apropos of the new crop of cranks now pestering the officials of the American Chemical Society. Fantastic inventions, the "key to evolution," the "paracelsus two-force energy of the root of the atom" and similar jargon are regarded by Dr. Whitmore as a queer outgrowth of modern mass education in elementary science and the uncritical use of science libraries. As Mark Twain would say, the deluded devotee of science "knows the words but he doesn't know the tune." Such complete ignorance of the real working principles of science operates in peculiar ways. It is driving the real scientist into the apparent position of an intellectual snob. More strikingly it is misleading multitudes of people by discrediting the theory of evolution by the use of fancy scientific verbiage.

It is high time to stop stuffing mere chemical facts into the heads of college students, according to Dr. Joel H. Hildebrand, of the University of California, in a forceful challenge to the national assemblage of chemical educators here. There are over three hundred thousand different chemical compounds already known, and the new chemical discoveries in one year in the United States alone cover ten thousand printed pages of reports. It is utterly hopeless for the greatest chemical genius on earth to learn one per cent. of the known facts of chemistry.

Dr. Hildebrand's slogan is not what chemicals are like but how they work. Complete elimination of the cram system in college examinations is the immediate result of the new system of chemical education. For the student with a mind like a mere phonograph record the plan is, however, almost fatal unless he starts to do some thinking.

The life of the American synthetic drug industry depends on the coming decision of the United States Supreme Court in the German patent case. Dr. Arthur D. Hirschfelder, University of Minnesota pharmacologist, scored the political interests who have place the department of justice in the position of a pro-German litigant now seeking to rob American drug manufacturers of the

patent rights on arsphenamin, novocaine and numerous priceless preparations vital to the work of the modern surgeon. After publishing deceptive recipes in patent papers and forcing the war-time drug factories to spend enormous sums in research to find the real recipes, the German patentees are making a final drive to persuade the Supreme Court to cancel all American licenses given by the Chemical Foundation.

Methanol, the new German synthetic alcohol, is entirely too pure, according to Dr. H. E. Howe, noted industrial chemist and officer of the American Chemical Society. This warning comes on the heels of the Harvard University report that synthetic methanol is highly poisonous. It now appears that the new alcohol is a sweet, pleasant-smelling spiritous liquid which will pass anywhere for the regular beverage alcohol.

The old wood alcohol from American distilleries is a foul liquid giving its own danger signal and is thus ideal for denaturing painters' alcohol. Germany is flooding the United States with the new alcohol, and already steps are reported taken by bootleggers to secure methanol in 10,000 gallon lots if it can be put over on the drinking public. Denatured alcohol, normally noxious from its few per cent. of wood alcohol, may be legally turned out using the treacherous German denaturant. Federal action to outlaw methanol as a denaturant may be expected at an early date.

Milk powder, now being universally introduced into bakers' bread, is very good for growing children, according to Dr. H. E. Barnard, director of the American Institute of Baking. Dr. Barnard stated further that the modern quick lunch sandwich made of milk-treated bread and containing a lettuce leaf is one of the most complete meals one can obtain on short notice, and infinitely superior to the conglomeration commonly called a business man's lunch.

The transportation of the frightfully poisonous liquid hydrogen cyanide by motor car is raising a serious new highway hazard, according to Mark Walker, cyanide expert. The liquid, of which one good whiff is instantly fatal, boils without artificial heat and must be stored in steel cylinders. Recently the material has been getting the habit of slow decomposition into gases whose pressure amounts to explosive magnitude, and a rupture of a cylinder resembles a combination of high explosive and gas barrage.

F. E. Rowlands, Oregon chemist, reported that three tons per day of Port Oxford cedar oil, a beautiful, water-white, fragrant oil, are being discarded as mill waste in one Oregon lumber district alone and a seventy-year supply looms ahead. He appealed to the chemists to find some use for this material to end the present waste.

The human nervous system is really a living telegraph line made up of a chain of electrical condensers, thinks Dr. W. R. Whitney, of the General Electric Company. This idea is sharply disputed by scientists, who say that nerve messages do not travel at the speed of electricity, but Dr. Whitney demonstrated with condenser apparatus that the transit time of a message can be slowed down even to three seconds, a time much longer than the known nerve reaction time of a human being.

Benzene, the famous chemical base of the color and drug industry, is now available from oil gas plants of the Pacific coast, E. L. Hall reported. The product will likely all go into motor fuel, as benzene is a valuable anti-knock material as well as a powerful fuel.

Where does evolution begin? Dr. Alexander Findlay, of Aberdeen, Scotland, who gave the opening address to the American Chemical Society, ventures to locate the beginnings of life not in an Asian oasis, but in the chemical colloidal particle. The noted Scotch physical chemist sees no possibility of life within the control of a simple crystal or an uncombined atom of carbon or hydrogen. However, when a few billion molecules of pulpy carbonaceous matter collect in a colloid particle, like a tiny lump of jelly, and join others of like kind, then the divine force steps in and a new chapter of science is started.

Dr. Findlay pictured the troubles of these tiny composite particles, interwoven finally into a living cell. Its problems are still those of chemistry, although a start of a biological process has been made.

Himself a lifelong member of the Church of England, Dr. Findlay is aghast at the proposition of legislative interference with the teaching of evolution, and points out that such restriction logically applies all the way down into the domain of ultramicroscopic life. No line can be drawn between the evolution of man and the elaboration of the colloid. Interference with the teaching of evolution simply means paralyzing the training of youth, who will later be fighting cancer, tuberculosis and unsolved diseases which are quite likely caused by the misdeeds of colloid particles.

The chemists actually listened to matter changing into energy when Dr. W. R. Whitney, of the General Electric Company, connected a piece of the rare metal uranium to a radio amplifier, so that the disintegration of the atoms was broadcasted over the whole theater.

It was stated that this show, if necessary, could be kept on the boards for five hundred million years, after which the uranium would cease its remarkable transformation and merely turn into a piece of lead not much smaller than the original substance. For an hour various pieces of so-called matter were put through fascinating antics in which their inner electrical energy flashed and sputtered under the stimulus of a stage full of apparatus.

Apparently coal and oil are actually energy in the form of myriads of particles of electricity. Burning coal to get power is just scratching the outsides of the constituent atoms. Unfortunately Dr. Whitney promises no immediate scheme for boring down into the central superpower zone of the carbon atom, and the enormous energy is tightly locked with bonds of unknown strength. Apparently uranium atoms are too unwieldy to keep together and disintegrate without any power of man to control the process. Unquestionably the sun contains matter of this sort and is generating energy by the atomic disintegration method, but it is impossible to observe any material deep enough in the solar body to afford a definite report on its identity.