

INVENTION

Lone Inventor Still Rates High in United States

► THE LONE inventor working away in a cellar or workshop is still an important cog in United States economic growth.

Despite the sky-rocketing growth of research work in Federal, industrial and private research laboratories during the last 20 years, the solitary inventor still manages to earn nearly 40% of all the patents issued. This percentage has remained relatively stable since 1936, a U.S. Patent Office study showed.

This smashes the common notion "that the lone inventor is being exterminated by the 'captive'—the research laboratory employee," experts at the George Washington University's Patent, Trademark and Copyright Foundation disclosed.

"More than half the inventions patented in the United States are used some time before the patents expire," the survey also noted. Previous estimates ranged from a meager 1% to 18%, with 5% most commonly used.

A random sampling of all patents issued in 1938, 1948 and 1952 and a questionnaire sent to the patent owners were used to compile the figures.

Between 55% and 65% of all assigned patents had been in production to some extent and at some time.

• Science News Letter, 80:56 July 22, 1961

PUBLIC HEALTH

Many Ills From Sunburn, Vacationers Are Warned

► SUNBURN IS NO JOKE. The lily-white red-haired secretary who takes off blithely for the beach on her summer vacation had better take her sunlight gradually, even on cloudy days.

Overexposure to sunlight can cause not only sunburn but a large family of diseases of the skin, including skin cancer, premature aging of the skin, and a group of light-sensitive and light-caused ailments.

In severe cases of sunburn, chills, fever and prostration may occur.

There is a high incidence of skin cancer and other diseases in Texas caused by overexposure to sunlight.

One method of protecting the skin uses the drug, 8-methoxypsoralen (8-MOP), which in capsule form can be taken by mouth before exposure to the sun. Much research has been done on this derivative of the Egyptian weed, *Ammi majus*. Although it promotes tanning by a photodynamic action, there are some inherent drawbacks in its use.

First, the skin not only tans more readily but sunburns more easily. Extreme care must be taken in using such products, both by mouth and applied on the skin, to avoid the sunburn reaction.

Second, on discontinuing the drugs, the melanin (dark pigment) concentration in the skin will decline. Therefore, the drugs must be administered again at regular intervals. There also may be unpleasant, or even toxic, side effects.

But the value of sunlight taken in moderation cannot be discounted. The vitamin D it forms in the body prevents rickets in children.

Sunlight's contribution to the well-being of all ages has been accepted. Although this reaction may be largely psychological, there is a possibility that sunlight-induced, biochemical alterations may also be somehow involved.

Psychological or physical in its benefits, sunshine is going to be embraced by some millions of Americans in the next weeks before Labor Day. To avoid a painful sunburn, spend only 10 to 15 minutes in the direct rays of the sun at first.

Plain vanishing cream, containing 10% para-aminobenzoic acid, gives 30 times as much protection as many commercial suntan products, Dr. William Becker Jr. of the University of Illinois has reported.

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MEDICINE

Gluten-free Diet Treats Nontropical Sprue

► NONTROPICAL SPRUE, which appears to be an inherited disease causing digestive disturbance, has been alleviated in 27 of 29 patients treated in New York, by a gluten-free diet.

The characteristic diarrhea, abdominal distention and weakness stopped and the patients' appetite returned within days to six weeks, Dr. Marvin H. Slesinger of New York Hospital-Cornell Medical Center, New York, reported in *The New England Journal of Medicine*, 265:49, 1961.

One patient, ill from the age of 15 months to 23 years when she was treated at the New York Hospital, had allergies to rye, barley, oats, chocolate and spinach. She remained well for two and a half years on the gluten-free diet and became the mother of twins.

Dr. Slesinger and his colleagues have worked for seven years with the 29 patients, some of whom had shown symptoms of sprue for 35 years. Although gluten-free diet has been reported helpful by other investigators, clinical and metabolic studies reported by Dr. Slesinger throw further light on the subject.

He said an enzyme deficiency appears to affect the intestinal lining, absorptive mechanism and protein metabolism, but further study is necessary to explain exactly how this happens.

A palatable gluten-free bread was developed at the University of Toronto, Canada, as early as 1955, but so far it is not available in this country, according to dietetic authorities.

On Feb. 18, 1955, SCIENCE SERVICE reported that Miss Betty Upton of Toronto had developed a gluten-free bread that could be included in the diet of sprue patients. She used potato flour, egg white, tetrasodium pyrophosphate, calcium lactate, finely ground bran, cream of tartar, salt and sugar. Previous efforts at making gluten-free bread, Miss Upton said, had failed because baking powder was used in large quantities and a metallic taste resulted.

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IN SCIENCE

TECHNOLOGY

Vast Files Searched Fast In Electronic "Library"

► AN ELECTRONIC "library" capable of pinpointing and delivering one printed page from among millions in a matter of seconds has been demonstrated.

The new WALNUT system, developed by International Business Machines Corporation, transfers a tiny image of the needed document to an IBM card. A full-sized copy can be viewed on a screen or printed without removing the document from the files.

The prototype system, built by the IBM Advanced Systems Development Division, San Jose, Calif., will be used by the Central Intelligence Agency. There are no plans for commercial marketing.

Filed documents are photographed and reduced to about one-thousandth their original size. They are transferred to film strips, each holding 99 images. At the same time, control cards record the file location. Each storage bin holds a total of 990,000 images. With at least 100 files, the equivalent of a library of more than 300,000 books can thus be contained in a space the size of a standard office desk.

Since the original image never leaves the file, there is no chance of its being misfiled or removed.

Similar image retrieval systems, IBM officials believe, would be valuable for storing scientific periodicals, engineering drawings, legal documents, patent records, drivers' license records, medical case histories and real estate titles.

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ASTRONOMY

Jupiter's Dark Band Is Shadow of Comet Halo

► A RING OF COMETS and meteorites probably circles around the planet Jupiter, a Russian scientist reports.

A dark band girdling Jupiter at its equator is actually the shadow cast by the huge halo, Dr. S. K. Vsekhsvyatskiy, astronomer at Kiev State University in Russia, emphasizes. The "shadow" shifts position as the planet rotates around the sun in a manner expected for a shadow, Dr. Vsekhsvyatskiy notes.

The ring of comets and meteorites supposedly formed many millions of years ago when an explosion on Jupiter sent huge masses of rock hurtling into space. The tremendous pull of the large planet's gravity trapped the rock pieces into orbiting around Jupiter in a ring-like mass, the Russian scientist reports in a translation by the U.S. Joint Publications Research Service, Washington, D. C.

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E FIELDS

ENTOMOLOGY

Bait for Termite Trap Found in Decaying Wood

► A BAIT that attracts termites as much as cheese attracts mice has been isolated from rotting wood. The bait will be useful in controlling these destructive nibblers, which do hundreds of millions of dollars of damage each year in the United States alone.

The bait, in relatively pure form a colorless oil, is a more or less natural lure because it is extracted from the termites' usual food—wood that is decaying from infestation with fungi. Certain of these fungi or their products help form powerful attractants that guide the termites to an edible piece of wood.

Drs. G. R. Esenther, T. C. Allen, J. C. Casida and R. D. Shenefelt of the University of Wisconsin and the U.S. Department of Agriculture Forest Service, both in Madison, Wis., tested the attracting powers of several kinds of fungi and found that neither healthy wood alone nor fungus alone attracted the termites.

In combination, however, wood and fungus made a very good lure.

The most powerful attractant was produced in pine wood infected with the brown rot fungus, *Lenzites trabea*. All three kinds of termites tested preferred the wood decayed by this particular fungus, and within two minutes most of them had clustered around the wood parts where fungus growth was mature or "woolly." Extracts of this part of the wood attracted the insects even faster than the whole wood. Every termite in a test box gathered around a pad containing the extract within 30 seconds.

This response occurred despite the fact that the termites were in the light and exposed to dehydration, the scientists report in *Science*, 134:50, 1961.

• *Science News Letter*, 80:57 July 22, 1961

GENERAL SCIENCE

Colleges Buy Own Tools, But U.S. Pays for Work

► COLLEGES and universities doing scientific research buy most of their own equipment and foot the bulk of the bill for building new laboratories or remodeling old ones.

It is Federal money, however, that makes up the major share of the far larger bill for the actual research work.

These are the chief findings in a National Science Foundation survey of research and development costs at the college level in fiscal 1958, latest year for which figures have been gathered and processed.

The 253 independent institutions of higher learning reporting on capital outlays for research facilities and other items in the natural and social sciences spent

\$153,539,000. The Government's share was \$41,361,000 or about one-fourth.

Operating expenditures for budgeted research and development during the same year totaled about \$740,700,000. Federal support accounted for 73% of this, or about \$540,700,000.

The Foundation notes: "It may be seen that the role of the Federal Government in the support of research and development was reversed from that of support of capital items for this work."

The \$112,178,000 in non-Federal sources for facilities and equipment came from the institutions' own funds, State appropriations or private endowments. Federal support was largely confined to research centers administered for the Government, such as the University of Chicago's Argonne National Laboratories, which got \$26,000,000.

Some 50% of the total capital expenditures went to the life sciences, reflecting "the need for costly medical school facilities," the Foundation said. The physical sciences received 33%, engineering 15% and the social sciences three percent.

The report, No. 28 in a Foundation series on "Reviews of Data on Research and Development," is available for five cents from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.

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ARCHAEOLOGY

Old Hungarian Church To Be Kept in Glass Case

► AN ANCIENT CHURCH in Hungary will be preserved for posterity in a glass case.

The church, located at the village Zsambek some 20 miles from Budapest and now in ruins, will be restored in two stages. First the stones scattered around the church will be put back into place and loose stones will be secured. Then the entire nave, along which the stone walls are missing, will be cased in glass.

The glass covering will be supported by a light metal framework and will help prevent further damage to the church.

The idea for the glass support originated with Prof. Frigyes Pogany of the Budapest Technical University. Many colleges from the University are supporting the restoration project, it is reported by the Director of the Royal Geographical Society, Lawrence Kirwan, in *Antiquity*, 35:58, 1961.

Mr. Kirwan reports that the church was built in 1258 and is considered a fine example of Romanesque-Gothic style. French art historians believe that Villard de Honneourt, a genius of 13th century architecture, helped build it.

The building was used as a fort by the Turks in the 16th century. Its ruin is believed to date from 1581 when the Hungarians tried to take it back from the Turks.

Since then, local builders have helped themselves to stones for building purposes. It is believed that all the stones missing in the church are now built into the houses in the village.

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BIOCHEMISTRY

Virus Particles Line Up At a Certain Stage

► AT A CERTAIN STAGE of growth within a cell, the particles of at least one type of virus line up in neat columns. A research team at Columbia University's College of Physicians and Surgeons studied the growth of type nine ECHO virus, which causes a grippe-like disease in man, in kidney cells from the rhesus monkey. They found that the virus particles arrange themselves along parallel filaments within the cytoplasm of the cell.

In photographs taken with an electron microscope, this alignment makes it appear that small patches of window screen are scattered about the cell, except that the holes of the screen are solid (the virus particles) and the wire spaces are blank.

Some of the solid spots are very dark. These are the complete particles. Other spots are lighter in color and these are incomplete particles, Drs. Richard A. Rifkind, Gabriel C. Godman, Calderon Howe, Councilman Morgan and Harry M. Rose report in the *Journal of Experimental Medicine*, 114:1, 1961.

Cut in cross section and magnified 258,000 times, the particle arrangement is hexagonal. Although the pattern is often somewhat askew, each particle is surrounded by six others and membranes can be seen.

The particle arrangements seem to accumulate around particular granular masses in the cell at one stage of growth and then move out to the edge. Finally the particles escape through tears in the cell membrane and the cell may disintegrate.

The intact cell seems to serve as a protective incubator for the virus particles. The incomplete particles become numerous during advanced stages of infection, but they are never found outside the cell. Such evidence indicates that the incomplete particle is unstable.

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TECHNOLOGY

Irradiated Plastics Become Semiconductors

► IRRADIATION of chlorinated plastics with ultraviolet light converts them into semiconductors, the materials from which transistors and related electronic items are made.

This discovery is reported in *Nature*, 191:164, 1961, by Gerald Oster, Gisela K. Oster and Marian Kryszewski of the Polytechnic Institute of Brooklyn, N. Y. They used the chlorinated plastic, saran, for their experiments. Ultraviolet light is in the invisible range with wavelengths shorter than visible light.

They found that at the border of irradiated regions unique p-n junctions occurred as in other semiconductors. The irradiated samples also showed photoconductivity in that they conducted an electric current when exposed to light. The photoconductivity appears to be due to trapped, unpaired electrons.

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