have difficulty in limiting ourselves to proofs which have mathematical precision. Moreover, there need be little correlation between the amount of formal mathematics used by the investigator and the substantial validity of the proof offered.

It is a homely saying that the proof of the pudding is in the eating thereof. For most practical purposes this may be a sounder proof than any based on the perusal of the recipe or on a chemical analysis of the constituents. Many a recipe which ought to have made a fine pudding has resulted in one quite inedible.

In many proofs we introduce the notions of cause and effect. We do not often so speak in the composition of puddings, and the validity of a notion may be questioned. In geometry we do not say that the base and the altitude of a triangle cause the area to be what it is. We think merely of the three quantities, base, altitude, area, as connected by a certain relation. In mechanics we no longer think that the force causes the motion; we have only concomitancy of variables. In complex systems which depend on a multitude of variables connected by a variety of relations, often unknown, it is clear that the usual situation must be that any imposed change in one of the variables may be distributed widely through the system; if the system is in quasi-equilibrium, if it is a going concern, it will probably exhibit the characteristic of homeostasis,[6] in the terminology of Dr. Cannon. The analysis into cause and effect is more necessary when one comes to speak of control, for control consists in obtaining the desired effects (and avoiding undesired ones) through specific measures. The element of the will enters, the individual or social will, and, with it, causation in a sense somewhat different from that in which it is attributed to non-willing nature. It does not do to overlook such generalities in speaking of proofs in a practical world.

My fundamental contention, then, is that proofs, truth and facts must be relative to our culture and conditioned by it; that for different purposes they must not only be different but may even be differently conceived; that science can not be all things to all men but must consist of some very special things to limited groups of specialists who deal with various questions of pure and applied science. For our development we have to depend on the professional ethics and the professional discrimination of those small groups; they must not fool themselves or attempt to fool one another within a group as to what is a proof or as to what are the facts; it may be impossible for them to explain themselves truthfully to non-specialists without departing widely from the strict canons of proof which they adopt among themselves.

SCIENTIFIC EVENTS

THE NEW CHAIR OF ASTRONOMY AT THE ROYAL INSTITUTION

IN connection with the establishment of the professorship of astronomy at the Royal Institution, to which Sir James Jeans has been nominated, the London *Times* writes as follows:

The year 1863 was the last occasion when a new chair was created. This was for Dr. (afterwards Sir Edward) Frankland, who was elected to a separate professorship of chemistry, while Faraday was still the Fullerian professor of chemistry. Frankland's professorship lapsed after Faraday's death. The other "elected" professorship in the institution at the time, that of natural philosophy, had been established ten years earlier, and was not so short-lived. It was created for Tyndall when he went to the institution in 1853, and since his retirement in 1887 has continued by election and reelection down to the present day.

By their resolution to establish a new professorship, the members of the Royal Institution have exercised a privilege they have possessed since the foundation of the institution. A proposal for a professorship in astronomy was made and agreed to in 1811, but no appointment followed and the proposal was dropped. But astronomy is by no means a new subject to the audiences at the Royal Institution. It has appeared at intervals in the lecture lists and has been of particular interest to the sons and daughters of members, for the first of the famous Christmas courses "addressed to a juvenile auditory" was given by Wallis in 1826 on an astronomical subject; and in later years Sir Robert Ball, Sir David Gill and Professor H. H. Turner became popular Christmas lecturers on astronomy.

Sir James Jeans is already known to the children of the present members of the institution, for he gave the Christmas lectures of 1933 on "Through Space and Time." It is by these lectures that he satisfies the requirement of the by-laws that a new professor must have delivered a course of lectures to the institution within two years previous to his election.

Since Tyndall, three physicists of great distinction have held the professorship of natural philosophy at the institution and have also been, in turn, the Cavendish professor of physics at Cambridge. The late Lord Rayleigh soon after his retirement from Cambridge accepted an invitation to the chair of the Royal Institution

[6] The effort to view the economic system of a country as a whole with the understanding that a multiplicity of well-balanced measures is necessary to get and keep the balance of the system is well illustrated by Douglas Copland's "Australia in the World Crisis." Dr. W. B. Cannon's book is entitled "The Wisdom of the Body."

and held it until 1905, when he was succeeded by Sir Joseph J. Thomson. The present professor, Lord Rutherford, took up the duties in 1921. The rules prescribed at the beginning of the institution for the election of professors are still followed, and thus it is that Lord Rutherford as an "elected" professor must seek the suffrages of the members every year, while Dewar's successor in the endowed Fullerian professorship of chemistry, the present resident professor, Sir William Bragg, does not do so.

THE STRATOSPHERE BALLOON OF THE NATIONAL GEOGRAPHIC SOCIETY AND THE U. S. ARMY CORPS

THE completion of the gondola for the flight to the stratosphere planned for June under the auspices of the National Geographic Society and the U. S. Army Air Corps has been announced.

The gondola, made in Midland, Michigan, of a magnesium alloy lighter than aluminum, has been shipped to Dayton, Ohio, where, at Wright Field, its equipment will be installed under the supervision of Captain Albert W. Stevens and Captain Orvil A. Anderson, the commander and pilot for the flight. The gondola will then be shipped to Rapid City, South Dakota, from the neighborhood of which the ascent into the upper atmosphere will be made.

The hollow metal ball is nine feet in diameter, the largest gondola yet designed for stratosphere exploration. Last year's gondola was eight feet, four inches in diameter. A level floor extends across the sphere a foot and a half above its lowest point; and on this the two balloonists will have ample room in which to move about and take care of their air-conditioned, floating laboratory.

The flight this year will make use of a balloon considerably larger than any heretofore built. The giant bag now under construction in Akron, Ohio, will have a capacity of 3,700,000 cubic feet of gas.

Utilizing the experience gained last year, when their 3,000,000 cubic-foot balloon developed a tear and crashed in southern Nebraska, the sponsors of the flight have incorporated many improvements. The most important difference will be the use of helium gas instead of hydrogen. Helium can neither burn nor explode. It is more expensive than hydrogen, however, and has never before been used in stratosphere exploration.

CONFERENCE ON SPECTROSCOPY AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

A THIRD special program on spectroscopy and its applications is to be held at the Massachusetts Institute of Technology this summer, culminating in a research conference to be held during the week of July 15 to 20. This conference, which is to be held in the George Eastman Research Laboratories, will comprise lectures and discussions on photographic photometry, absorption spectrophotometry, spectroscopic analysis of materials, biological and chemical effects of spectral radiation, spectroscopy of the extreme ultraviolet, and astronomical applications of spectroscopy. The meetings of the first day will be largely devoted to consideration of general spectroscopic problems of the metallurgist, chemist and biologist; on Tuesday and Wednesday the chief emphasis will be on specific applications of spectroscopy to biology and medicine. During the latter part of the week applications of spectroscopy to astronomy will be emphasized, a portion of the program being held in collaboration with the Harvard Observatory Summer School.

The research conference coincides with the conclusion of the summer school courses in practical spectroscopy and the meetings are open to all those interested. An invitation is being extended to all properly qualified investigators, to make use of the facilities of the laboratory of spectroscopy in connection with their researches during such portions of the summer months as they may desire. A bulletin giving further information regarding the entire summer program on spectroscopy can be obtained by addressing Professor G. R. Harrison, Department of Physics, Massachusetts Institute of Technology, Cambridge.

FELLOWSHIPS OF THE CHARLES A. COFFIN FOUNDATION

THE fellowships of the Charles A. Coffin Foundation of the General Electric Company have been awarded to eight college students from widely separated sections of the country to enable them to pursue studies and carry on research which, without such financial assistance, they would be unable to undertake in educational institutions of their choice. The fellowships are awarded annually to encourage and assist in the pursuit of research activities in the fields of electricity, physics and physical chemistry.

Fellowships have been granted by the Charles A. Coffin Foundation annually since 1922, when the foundation was created by the board of directors of the General Electric Company for the composite purpose of assisting deserving college graduates in post-graduate work, recognizing the achievements of electric power companies, and electric railway companies, and rewarding employees of the General Electric Company who each year advance the efficiency of the company or contribute by meritorious work to progress in the electrical arts. Since 1923, the foundation has made available a total of $65,000 for fellowships. This year there were seventy-three students who submitted applications to the committee of award.

It is reported by the General Electric Company that sixty per cent. of those men who five years or more