of medical research, has been given to the board of regents by Mrs. Christina MacDonald Simpson, widow of the late Thomas H. Simpson, Detroit manufacturer. The endowment is to be known as "The Thomas Henry Simpson Memorial Institute for Medical Research." The letter of presentation sets forth that $150,000 of the gift shall be devoted to the erection of a building for medical research in conjunction with the university. The remainder is to be invested in securities, the income of which is to be used for payment of salaries of medical and scientific directors and their assistants in the conducting of the research. Mrs. Simpson asks that the research work be devoted primarily to the study of pernicious anemia, the disease of which her husband died.

ANNOUNCEMENT has been made by Dr. Jacob Diner of plans to establish in New York City a national academy of pharmacy, similar to the Academy of Medicine, where pharmacy will be given the dignity of educational and ethical standards it is entitled to enjoy as a specialized branch of medicine. Dr. Diner says: "The new building will have a library to which pharmacists may go for information obtained from books not owned by most pharmacists. The library will be in charge of competent persons who will assist in getting the desired information. There will be magazines of interest to the profession. Scientific lectures by pharmacists of note will be given, and there also will be public lectures on hygiene and sanitation and the use and abuse of drugs. Persons desiring information can telephone the library with certainty of obtaining reliable information. Since the law officially recognizes pharmacy as a profession, the members of the profession feel that those who are unqualified and who do not think of public service should be driven from the profession."

IN connection with the new engineering building at the University of Michigan, the department is engaging upon an extensive study of the fundamental properties of cast irons, utilizing the foundry, metallurgical and chemical laboratory facilities provided in the structure. According to *Chemical and Metallurgical Engineering*, the progress made up to the present time indicates that important results will be derived in the endeavor to determine which basic properties are responsible for the different and decided variations in the strength of cast iron. The equipment in the engineering building is suitable for carrying through investigations and experiments in the line of erosion and corrosion resisting cast irons; heat resisting cast irons; malleable cast irons; measurement of melting and pouring temperatures; cupola practice; molding sands; facing sands, and the like. In addition, facilities are available for undertaking investigations on core oils and core binders in general. Along the latter lines, some preliminary research has been made with regard to the properties of commercial core oils, and a definite program is being developed for this work to ascertan a standard test procedure for determining the qualities of same. It is purposed to raise a sufficient fund to carry out this work.

UNIVERSITY AND EDUCATIONAL NOTES

THE General Education Board has contributed $2,000,000 to the endowment of the University of Chicago, on condition that the university raise $4,000,000 additional for the same purpose.

NORTHWESTERN UNIVERSITY has received gifts of $675,000 from anonymous donors. The university embarked in 1920 on a campaign to raise in a ten-year period $25,000,000.

A FERTILIZER school has been opened at Texarkana, Tex., under the direction of experts of the Texas Agricultural and Mechanical College and from the College of Agriculture of the University of Arkansas, Fayetteville, Ark. The initial attendance totals 300 persons from the border counties of the states of Texas and Arkansas.

PROFESSOR KARL T. COMPTON, whose appointment to the department of physics at the University of Chicago was announced in SCIENCE last spring, has been released from the appointment, owing to the situation created in Princeton University by the resignation of Professor Trowbridge, and will continue his work of directing research in physics at Princeton. Professor W. F. Magie has resigned from his position as dean of the faculty and will continue his active work as head of the department of physics. Professor Howard McClenahan, who has been dean of the college, has been granted leave of absence from Princeton University for the coming year, and will, on his return, resume his work in the departments of physics and electrical engineering.

DR. E. D. FRIEDMAN, who is attached to the staff of Bellevue and Mt. Sinai hospitals, has been appointed clinical professor of neurology in the medical department of New York University.

DR. FRANKLIN G. EBAUGH, director of the department of neuropsychiatry at the Philadelphia General Hospital, has resigned to accept a position as professor of psychiatry at the University of Colorado, and director of the Colorado Psychopathic Hospital, Denver.

P. F. SHANNON, division superintendent for the Mutual Oil Company, has accepted a position as as-

sistant professor of petroleum engineering at the Colorado School of Mines.

JAMES MONTAGU FRANK DRUMMOND, director of research for the Scottish Society for Research in Plant-breeding, has been appointed Regius professor of botany in the University of Glasgow, in the room of Professor Bower, who has resigned.

DR. WILHELM EITEL, professor of physico-chemical mineralogy and petrography at Königsberg, has been invited to the chair of mineralogy at Freiburg-im-Breisgau.

DISCUSSION AND CORRESPONDENCE

THE POPULATION OF CANADA

MALTHUSIANISM has returned. The discussion of the problem of population is widespread. East's "Mankind at the Crossroads" and the scientific papers by Pearl and Reed now available in Pearl's "Studies in Human Biology" forecast populations or tell us of the dire consequences that may soon ensue. This summer in the Institute of Politics at Williamstown and in the meeting of the British Association at Toronto the problem was thoughtfully discussed. I heard at Toronto G. Udne Yule's clear and sympathetic exposition of the Pearl-Reed curve $1/P = A + Be^{-nt}$ followed by an expression of scepticism on the part of many economists. In conversation it was recalled that according to press reports Lloyd George when in Canada not so many months ago predicted a future population of 300 million for that great dominion. This seemed somewhat extravagant in view of the Pearl-Reed forecast of only 197 million for the United States and I resolved to examine the figures by the method of these scientists to check up on the politician and statesman.

We have had eight censuses in Canada decennially, commencing in 1851. The figures in millions are:

1851	1861	1871	1881	1891	1901	1911	1921
2.38	3.16	3.69	4.32	4.82	5.37	7.21	8.79

By various methods I reached the solution

$$1/P = -.0286 + .3967\ e^{-.0157t}$$

which was checked by Dr. W. J. Luyten of the Harvard College Observatory by treating it as a first approximation to be corrected with a least-squares solution. His result was

$$1/P = -.031 + .430\ e^{-.0155t}$$

t being measured in years from 1851. The solutions look decidedly different, but we must remember that in a minimum problem a considerable variation of the variables (here, A. B, n) may not effectively change the minimum value. For the two equations the fit is in fact equally good. The departures between the observed and the fitted values were in the 8 cases, respectively, about $+5, -6, -5, -4, +3, +10, 0, 0$ per cent., giving a mean algebraic error of less than one half per cent. and a mean arithmetic error of 4 per cent. Forecasting from the equations, it appears that about the year 2013 the population of Canada reaches the value 300 million set by Lloyd George.

Further, it appears that on some day apparently in the year 2020 the Canadian population will become infinite.

Dies irae, dies illa!

Somewhat disconcerted by this result I tried to fit the curves

$$P = d + \frac{1}{A + Be^{-nt}}$$

$$P = \frac{k}{1 + me^{at + bt^2 + ct^3}}$$

which are also used by Pearl and Reed when they desire a better fit than that given by the simple 3-constant equation. The last equation has five constants to fit to eight points. The results, however, remained disconcerting.

Solvet sæclum et favilla—

But I am not a good curve-fitter.

Now what, if anything, may these results mean? First, they can not in any way impugn Pearl's biologic postulate that populations must tend to saturation. Canada will never have an infinite population, nor yet 300 millions, nor perhaps more than one fifth of that figure. Second, they do not cast doubt upon his findings that experimental (laboratory) populations do follow his growth curves, nor upon his further demonstrations that human populations (for so long as good censuses have been available) in many cases have followed his curves with a high degree of fidelity and already disclose a tendency to saturation. The results do show, I think, that the Canadian population (and other instances could be given) so far fails to indicate approaching saturation as actually to show a runaway tendency.

And why should this not be so! The Malthusian dictum that population tends to increase in geometric progression whereas food tends to an arithmetic increase really implies in its latter half the economic law of diminishing returns (as applied to agriculture). It would be as silly to doubt this law, which is analogous to that of Chatelier in physical chemistry, as to question the saturation of population or the fact that increasing the pressure diminishes the volume. But all such laws are based upon the under-