by him are synonyms and 44 per cent. are wrongly placed as regards genera. Finally, in the whole treatment of the family, covering but seven and a half pages, I am able to count offhand as many as 49 misleading errors, and to offset these not a single feature which in any sense can be called progressive. Hence the obvious conclusion is that we find ourselves no farther advanced, as far as this family is concerned, than formerly. And as a corollary that which is not progressive and helpful in regard to taxonomy is worthless.

It is not fair, however, to condemn the whole work on such restrictive criticism without examining other parts of it, but space of course will not allow more than a few general remarks. Suffice it to say that in all of the other groups we find the same state of affairs as in the Trichogrammidæ and especially a lack of up-to-dateness in regard to new genera and species. Thus even as a bare list of described genera and species the volume would be seriously incomplete and as a contribution to the taxonomy of the superfamily absurd and ludicrous. As a catalogue it would take lower rank than that of de Dalla Torre (1898), which is notorious for its looseness, errors and lack of critical ability, but which, notwithstanding these, possesses much worth as a bibliography of the genera and species. But Schmiedeknecht lacks even in this respect—mainly because of incompleteness.

Of the 83 figures given but 18 of them are colored, in spite of the statement in regard to the 8 colored plates. Many of these figures are copied directly from Ashmead, Howard and Masi, and I find serious differences between these and the originals, but will not particularize here. They may finally take rank with the famous concoctions of Snellen van Vollenhoven; at any rate, it should be pointed out that they are none too trustworthy and by reason of that both obstructive and misleading. Moreover, many are given as original drawings without reference to sources, if such exist, and at least some of these are grotesque and bizarre in the extreme—to wit, the one of *Trichogramma*.

It is a serious thing to have to condemn in its entirety the result of such a prodigious amount of labor, yet it is no more than just and right that others should be warned to keep out of the path of this taxonomic derelict that they, ourselves and the whole future be not imperilled. Truly this volume is both a tragedy and a comedy of errors.

A. Arsène Girault

Urbana, Ill.,
August 2, 1910

The Population of the United States

To the Editor of Science: In the *Popular Science Monthly* for last April, and also in its issue for November, 1900, a formula was given for calculating the population of the United States corresponding to any time between 1790 and 1900.

As the results of each formula agree only approximately with those of the census, I thought it might be of some interest to present a formula that should agree exactly. Such a formula is the following:

$$P = A + at + bt^2 + ct^3 + dt^4 + et^5 + ft^6,$$

in which P denotes the population, in millions, t the time expressed in decades and estimated from 1790; while

$$A = +3.9,\ a = +0.523333,\ b = +1.603889,$$
$$c = -1.020833,\ d = +0.343056,$$
$$e = -0.0525,\ f = +0.00305555.$$

The formula holds good from 1790 to 1850, but from 1850 to 1910 the coefficients have the following values:

$$A = +23.2,\ a = +18.303333,\ b = -19.481111,$$
$$c = +12.470833,\ d = -3.544444,$$
$$e = +0.475834,\ f = -0.0244444,$$

and the origin of t is at 1850.

Any series of observations which depend on a single variable may be represented by a formula of this kind, and a table has been prepared by means of which the values of the coefficients, *a, b, c,* etc., can be easily and expeditiously calculated. By the aid of this table a formula could be developed which would give the exact results of the census from 1790 to 1910, and without any change in the values of the coefficients.

But the formula would contain nearly twice as many terms as the one here submitted, and there would be other disadvantages.

An empirical formula is valuable for purposes of interpolation; but it is utterly unreliable when used for making predictions, or extrapolations.

The following table gives a synopsis of the results of the United States Census as to population, and it is given mainly for the sake of calling attention to the last column, which affords a basis for making deductions in regard to the future growth of population.

Growth of Population

Year	Population by Census (Millions)	Population by Formula	Percentage of Increase
1790	3.9	3.9	
1800	5.3	5.3	36
1810	7.2	7.2	36
1820	9.6	9.6	33
1830	12.9	12.9	34
1840	17.1	17.1	33
1850	23.2	23.2	36
1860	31.4	31.4	35
1870	38.6	38.6	23
1880	50.2	50.2	30
1890	62.6	62.6	25
1900	76.3	76.3	22
1910	91.4[1]	91.4	20

The last column shows that the relative increase was practically constant during the first seventy years, commenced to decline at the end of that period and has continued to do so ever since; the decline during the last fifty years having amounted to 15 per cent. The decrease is likely to be more rapid in the future than it has been in the past, since the conditions for an increase of population are not as favorable now as they were in 1860, when there was so much unoccupied land. It seems evident, therefore, that unless agricultural methods are improved and the soil made more productive, or unless people become more economical, the population of the country is likely to reach a stationary state in fifty years or less.

FRANK GILMAN

BOSTON, MASS.,
July 25, 1910

[1] Preliminary estimate.

QUOTATIONS

SALARIES OF PROFESSORS

THE question of salaries for professors is one which will always be one of the questions most alive at Cornell. The Carnegie fund for retiring aged professors has been of great help in retaining good men up to the time of retirement, but at the present time, when incomes of men in various professions and trades have advanced so rapidly, the salaries of professors have not advanced with the increased cost of living. The result is that much of the teaching has to be done by young men on small salaries who are continually looking in a natural way for opportunities to broaden their incomes and fields of usefulness. It is probable that the original intention of furthering investigation, by retiring professors at a certain time, will be found to miss this particular mark, because research work represents a type of mind quite as much as it represents opportunity. Men who have not done research work in advance of retirement are not apt to do any after retirement. Our policy of selecting noted professors from different parts of the world, as Johns Hopkins has done, accounts for a part of our rapid progress, but we have need for large incomes which will attract the men who attract students as they do at some of the older institutions of learning in other countries. We need to be able to offer salaries of at least ten thousand dollars per year for men who have proven their ability to command such salaries, no matter whether such men have developed at Ithaca, or at other institutions of learning. In making up a teaching staff of young men who are simply in line for promotion on the ground of faithful work, there is always a menace to the character of the teaching, because propinquity is one of the great powers in this world, and if it is more convenient to fill positions with men who are near at hand, and who will accept such positions on small salary, the tendency is always toward filling the teaching staff with a cumbersome number of men of merit without genius, but it is the men of genius whose names are synonymous with the names of cer-