

## Starred Scientists Born or Trained in Indiana

By STEPHEN S. VISHER, Indiana University

Indiana was the state of birth of 81 starred scientists and the state in which 80 received their collegiate training. These Indiana scientists are about 3.6 percent of all the starred scientists who were born in the United States or received their college training here. They were starred in one or more of the seven editions of "American Men of Science" as especially distinguished in research. The voting was by secret ballot of the leaders in their science. Twenty-eight were starred in the first edition (1906), 11 to 13 in the second (1910), third (1921), and seventh (1944) editions, and 4, 5, or 8 in the other editions.

As part of an effort to learn more about what conditions are conducive to high achievement, the published data on the places of birth and of training of the starred scientists have been studied in considerable detail. In addition, a comprehensive questionnaire was sent in November, 1946, to those living, asking, among other questions, what influences they considered to have been most significant in their own case.

The present article is an abstract of some of the data on the scientists who were born in Indiana or who received their college degree there.

### Yield in Proportion to Population

Indiana is exceeded in yield of starred scientists per million of population at their average date of birth by the New England States, the other East North Central States, by half of the West North Central States, and by New York, New Jersey, Delaware, Maryland and Wyoming. Indiana exceeds the remaining states, most of them by a wide margin. For example, Indiana's total yield per million of population is more than 10 times that of Arkansas, Mississippi, or Oklahoma and more than 5 times that of Alabama, Georgia, Louisiana or New Mexico. It was more than 3 times that of North Carolina, West Virginia, Kentucky, Tennessee, Florida or North Dakota. It was more than twice that of South Carolina, Virginia, Colorado, Montana, Utah or Oregon.

In the yield of *botanists*, Indiana was surpassed only by 8 states (Connecticut, Massachusetts, Vermont, New York, Illinois, Michigan, Wisconsin, and Nebraska). In the yield of *zoologists*, Indiana was surpassed by only 10 states (New England, except R. I., New York, Kansas, Minnesota, Maryland). In the yield of *psychologists*, Indiana was surpassed only by 8 states (New England, Utah and Wyoming). For *astronomers*, Indiana was surpassed by 12 states (New England, Ohio, Illinois, Michigan, Minnesota, Colorado and California). As to *anatomists*, Indiana was surpassed by 14 states; as to *anthropologists*, by 4 states; as to *chemists*, by 15 states; as to *geologists*, by 17 states;

as to *mathematicians*, by 16 states; as to *pathologists*, by 12 states; as to *physicists*, by 25 states; and as to *physiologists*, by 12 states. Thus Indiana's rank among the states was lowest as to physicists and relatively low as to geologists, chemists, mathematicians.

Table 1 gives the number of these scientists born in Indiana by decade of birth and by science. It reveals that half of the total were born in the 20 years 1860-1879, 30 were born since 1880, none since 1904. The yield of starred scientists per million of population was about 11 for the 1870's, 10 for the 1860's, 6 for the 1880's and somewhat more than 3 per million for the 1890's and 1900's. The causes for these changes in productivity are significant, and merit discussion.

Table 1 also shows that nearly one-fourth, 19, were starred in zoology, while 12 were starred in botany, 11 in chemistry and 6 or 7 each in geology, physics or psychology. Each of the 12 sciences in which starring has been done is represented by 2 or more Hoosiers. The relatively large numbers starred in zoology reflects the influence of David Starr Jordan. Several of the botanists were students of John Merle Coulter.

TABLE 1. Native Indiana Starred Scientists  
Number born by science and decade of birth

Born . . . . . before 1860	1860's	1870's	1880's	1890's	1900's	1910's	Total
Anatomy . . . . . 0	0	1	0	1	0	0	2
Anthropology . . . . . 0	1	1	0	0	0	0	2
Astronomy . . . . . 2	0	1	2	0	0	0	5
Botany . . . . . 1	5	3	2	1	0	0	12
Chemistry . . . . . 2	0	2	1	3	3	0	11
Geology . . . . . 1	3	1	0	0	1	0	6
Mathematics . . . . . 0	2	2	0	0	0	0	4
Pathology . . . . . 1	1	0	1	0	1	0	4
Physics . . . . . 1	2	0	0	2	2	0	7
Physiology . . . . . 0	1	1	1	0	0	0	3
Psychology . . . . . 0	3	1	1	1	0	0	6
Zoology . . . . . 3	3	7	5	0	1	0	19
Totals . . . . . 11	21	20	13	8	8	0	81
Population							
Mid-Year							
Millions . . . . . 1.2	1.5	1.8	2.1	2.35	2.6		
Yield per							
Million . . . . . 9.1	10.0	11.0	6.2	3.4	3.1	0	

### Areal Contrasts in Yield of Scientists

List 1 gives by science the names of the starred scientists born in Indiana, with the year and place of their birth, and list 7 presents the birth places by counties. When these birth places are mapped, it is seen that just half of the counties yielded no starred scientists, and a quarter of them yielded only one each. By contrast, Marion County yielded 5, Switzerland, Johnson and Wayne counties each 4, and Jefferson, Union, Hancock, Allen and Vigo 3 each. The yield by quarters of the State's population at the median date of the birth of these 81 scientists (1875) is as follows: the southeast quarter was the birthplace of 29 scientists, giving a yield of 14.5 per 100,000 of population. The northeast quarter yielded 23, or 11.5 per 100,000 population. The southwest yielded 19 or 9.5 per 100,000. The northwest yielded 11, or 5.5 per 100,000. Thus the southeast quarter did nearly three times as well as the equally populous northwest, and the northeast fully twice as well. The eastern half of the state's population yielded 63.5% of the total number, the southern half yielded 58.5%.

The unglaciated part of the State yielded 8 starred scientists, or at a rate of 4.8 per 100,000 of population. The relatively prosperous lower Wabash Valley Lowland of the southwestern part of the State, south of Terre Haute, yielded only one starred scientist. These 9 southwestern counties yielded starred scientists at the rate of one per 220,000 people. Fifteen northwestern counties having a combined population of 250,000 people yielded none. Two of these northwestern counties contain Wabash College and Purdue University. Why should 15 counties east and southeast of Marion County having a combined population of 284,000 people yield 30 starred scientists or one per 9,500 people while a similar number of counties in the northwest having as many people yielded none?

### Theories as to Regional Contrasts in Yield

Seven theories as to the yield of notables are:

1. That leaders come from especially prosperous areas. This certainly is not true for all of Indiana. Crawford and Switzerland counties, two of the poorest in the State, yielded at the rate of 1 scientist per 4,200 people, while Benton, Howard, Rush, Blackford, Knox and many other rich counties with a combined population of much more than 200,000 people yielded not one starred scientist.

2. Another theory is that notable leaders come largely from areas which are educationally favored. In Indiana, for example, the counties containing Earlham and Franklin colleges and DePauw and Indiana universities yielded 10 starred scientists, one-eighth of the total number, although at the average date of birth of the scientists these counties contained only 95,000 people, or somewhat less than one-twentieth of the state's population. But on the other hand, 5 of the 6 counties which had the highest yield of starred scientists in proportion to population lacked colleges. These especially productive counties were Union,

Switzerland, Jefferson, Hancock, and Parke, with a total yield of 13 starred scientists from a population of 82,000 people, or an average of one scientist for 6,300 people. (Union and Switzerland counties did twice as well as this average). These 5 counties yielded starred scientists at about 50 percent higher rate than did the best 4 counties with colleges.

3. A third theory to explain the regional contrasts in yield of outstanding leaders is that they come from the culturally more advanced areas, not from frontiers. The Indiana data lends some support to this theory, as the southeastern part of the State was the first to be well-peopled, while the northwest was settled latest. However the inadequacy of this explanation is indicated by the fact that several parts of the state settled early yielded no starred scientist; an example is the southwestern part, Vincennes and Washington south to the Ohio River. Crawfordsville was another early cultural center which has yielded no starred scientists, although several have graduated from Wabash College. And Tippecanoe County, containing Purdue, has yielded none.

4. A fourth theory is that the distribution is erratic, a matter of chance. This theory is disproved by many data. The more the subject is studied, the more evidence is disclosed that "it is not mere chance."

5. A fifth theory is that wherever economic and cultural conditions are at least fairly favorable, the areal differences in yield of notables correlates with contrasts in the quality of segments of the population. In Indiana, a considerable number of the starred scientists were descendents of persons who left Germany in 1848 or soon thereafter, partly because they sought greater freedom from the oppression then imposed. Several other Indiana-born scientists were the children of Quakers or of Scotch Presbyterians who had come to Indiana from the Carolinas before the Civil War partly because they disapproved of slavery. The Quaker group, which settled largely fairly near Richmond (where they established Earlham College) yielded several of the starred scientists of Union, Wayne, and Randolph counties, and also the two from Parke County and the one from Orange County. The Scotch Presbyterians were less concentrated; they yielded several of the 81. Several other Indiana starred scientists had Puritan ancestors. Puritan "stock" has been especially productive of starred scientists, according to the returns from Cattell's 1904 and the present author's 1946 questionnaire, and to much other evidence. Most of the starred scientists born in northern Indiana had Puritan ancestors as did several of those born in southern Indiana.

6. A sixth theory is that outstanding leaders such as the starred scientists come from families that are especially alert, earnest, and ambitious, without respect to their racial backgrounds, and that such people tend to congregate in places of comparative opportunity for them to use their talents. Bits of evidence from the data as to the Indiana starred scientists which supports this theory include: When southeastern Indiana was relatively favored, it produced many leaders, but when, because of the depletion of soil and forest wealth and especially when greater opportunities opened elsewhere, many of the more ambitious

people moved away. As a result, southeastern Indiana has yielded few starred scientists for many years. For example none were born since 1880 in four of the southeastern counties which were especially productive earlier (Crawford, Jefferson, Switzerland or Union counties). Likewise not one was born since 1880 in the entire unglaciated part of the State. Indeed, all 42 counties south of Wayne, Johnson and Vigo have yielded only two since 1881, one born in 1887 (Mann), and the other in 1901 (Twitty). Another evidence of the selective migration of the parents of the starred scientists is that relatively many starred scientists were born in county seats, the local centers of greatest opportunity for talent. The considerable number born in college towns is another evidence. The fact that of the 30 born in Indiana since 1880, 12 were born in the Gas Belt of the late 1880's and 1890's is significant. The boom experienced there attracted relatively many ambitious people. Both of Indiana's Nobel Prize winners, Urey and Stanley, were born in the northern half of the State since 1892.

7. A seventh theory to explain the contrasts in yield of notables is that, from young people with the requisite ability, leaders come if they receive adequate encouragement from those close to them and from stimulating teachers, provided opportunities are afforded to them to develop their talents. Conversely, few become such leaders if sufficiently stimulating teachers are not available, and if they are not encouraged to prepare themselves adequately, and if opportunities to serve as leaders are not available. This theory has much support in Indiana.

#### Starred Scientists who Obtained College Degrees in Indiana

Of the 81 native starred scientists, 49 obtained their college degrees in Indiana and 31 graduated elsewhere, (one, Mooney, did not graduate). However, those who went elsewhere for their college training were matched by 31 who came from other states or countries to Indiana for their college degrees.

Table 2 shows by science and decade of graduation the number of starred scientists who received college degrees in Indiana. It reveals that 19 zoologists graduated in Indiana, 16 botanists, 13 chemists, 11 physicists, 8 psychologists, 7 astronomers, 2 each of anthropology, mathematics and physiology, 1 each of geology and pathology and none in anatomy. The available data indicate that of the 19 zoologists, 5 were students of David Starr Jordan and 8 studied under students of his who later taught in Indiana. In addition, several of Dr. Jordan's students were later starred in other sciences than zoology and gave him much credit for his having stimulated them to high achievement. Of the 16 botanists, about 5 were students of John Merle Coulter and 4 or 5 were students of his former students who later taught in Indiana. Of the 13 chemists, 4 graduated at DePauw, 2 of them under W. M. Blanchard; 3 graduated at Earlham and one each at Butler, Hanover, Manchester, Notre Dame, Purdue and Valparaiso. Of the 11 physicists, 4 graduated at DePauw, 3 at Indiana, and 2 each at Purdue and Rose

TABLE 2. Indiana colleges starred scientists collegiate alumni  
Number by Science and Date of Graduation

	Before 1880	1880- 1884	1885- 1889	1890- 1894	1895- 1899	1900- 1904	1905- 1909	1910- 1914	1915- 1919	1920- 1931
Anthropology.....	0	0	0	1	1	0	0	0	0	0
Astronomy.....	0	0	1	1	0	3	2	0	0	0
Botany.....	3	0	2	6	0	1	2	2	0	0
Chemistry.....	3	0	0	2	2	1	0	1	0	4
Geology.....	0	0	0	1	0	0	0	0	0	0
Mathematics.....	0	0	1	0	0	1	0	0	0	0
Pathology.....	0	0	1	0	0	0	0	0	0	0
Physics.....	0	1	0	5	1	1	1	0	0	2
Physiology.....	0	0	0	0	0	1	0	1	0	0
Psychology.....	0	1	0	2	0	1	2	1	1	0
Zoology.....	1	0	4	1	4	5	3	0	0	1
	—	—	—	—	—	—	—	—	—	—
	7	2	9	19	8	14	10	5	1	7

Polytechnic, none elsewhere. Of the 8 psychologists, Indiana graduated 5, Earlham, Evansville and Valparaiso 1 each (Stone graduated from both Valparaiso and Indiana University). Of the 7 astronomers, Indiana graduated 5, of whom 4 were students of the other one, John A. Miller. The remaining 2 were from Rose Poly and Valparaiso. The 2 anthropologists graduated at Earlham and I. U. The 2 mathematicians graduated at I. U. and Purdue; also graduated at I. U. were the 2 physiologists, the geologist, and the pathologist. (The names of these alumni are given in lists 2-5).

Table 2 shows that the number of subsequently starred scientists who obtained their college degree in Indiana fluctuated among the half decades. During 1890-1894, 19 graduated, during the next half-decade 8, but during 1900-1904, 14. Conversely, only 1 graduated 1915-1919, although 7 graduated since 1919. Why not? What happened at Indiana University, for example, which caused it to graduate 5 in 1902 and 8 in 1903-1906 but only two since then? Of 266 men who graduated there in the 1880's, 5 were starred; of the 833 who graduated in the 1890's, 11 were starred; of the approximately 800 who graduated 1900-1906, 14 were starred. For 1907-1929 inclusive about 8000 men were graduated from I. U. Of these only 2 were starred. Thus nearly 2 percent of the graduates of the 1880's later were starred, 1.3 percent of the graduates of the 1890's, 1.6% of those of 1900-1906, less than 0.1% of those of the next decade and none at all since then!

The fluctuation in the proportion of the alumni who subsequently were starred correlates with several conditions, including changes in the faculty, changes in institutional policies, changes in size of enrollments and classes, changes in opportunities, changes in the age of the faculty. The large number of graduates of 1902-1906 who became distinguished scientists clearly merits special consideration. Apparently the coming of W. L. Bryan to the presidency in 1902 and the establishment of the Graduate School aroused hopes and greatly stimulated various students. Why the drastic decline after 1906? Apparently this was partly due to failure of the expectations aroused in 1902 to materialize. Significant also was the sharp increase in enrollments which occurred then, and the relatively great growth of the law school and medical school. Moreover since about 1907 many of the students taking zoology have done so because it is one of the requirements for admission to medical school, not because they were especially interested in zoology. Such students tend to divert students who had planned on becoming scientists. Other factors influencing the decline were the relatively notable advancement in certain other universities, and the greater opportunities in business. (Gary was founded in 1906 and industrialization developed rapidly in Indiana following 1906.) The progressive aging of the faculty also played a part. In 1902, most of the faculty were relatively young. Many of them continued in power, as heads of their departments, for some decades. When President Bryan retired in 1937, at the age of 77, many of the department heads and deans were elderly and, as is true of most elderly persons, no longer optimistic and enthusiastic.

List 2 gives by science and institution the names of the collegiate alumni, with the year of their graduation. (Stone received two bachelors degrees. Pike is listed under both zoology and physiology.)

As a sort of appendix are given 6 lists. List 3 gives by schools their starred alumni; List 4 and 5 give these by year of graduation, with some summary data. List 6 gives, alphabetically, the names of the 81 starred scientists born in Indiana. List 7 gives them by counties. List 8 gives those 31 born elsewhere who received college degrees in Indiana. At the end there is a summary and some conclusions.

LIST 1. INDIANA STARRED SCIENTISTS, BIRTHPLACES BY SCIENCE  
With Year of Birth Given After the Name

**Anatomy:** (2) A Kuntz '79 (Batesville, Ripley Co.); W. F. Windle '98 (Huntington, Huntington Co.).

**Anthropology:** (2) J. Mooney '61 (Richmond, Wayne Co.); C. Wissler '70 (Wayne Co.).

**Astronomy:** (5) C. L. Doolittle '43 (Ontario, Lagrange Co.); J. C. Duncan '82 (Knightstown, Hancock Co.); J. A. Miller '59 (Greensburg, Decatur Co.); Slipher, E.C. '83 & V.M. '75 (Mulberry, Clinton Co.).

**Botany:** (12) C. R. Barnes '58 (Madison, Jefferson Co.); H. L. Bolley '65 (Holman, Dearborn Co.); O. W. Caldwell '69 (Lebanon, Boone Co.); H. M. Fitzpatrick '86 (Greenwood, Johnson Co.); R. B. Harvey '90 (Monroeville, Morgan Co.); D. T. MacDougal '65 (Liberty, Union Co.); G. T. Moore '71 (Indianapolis, Marion Co.); D. M. Mottier '64 (Patriot, Switzerland Co.); E. W. Olive '70 (Lebanon, Boone Co.); J. N. Rose '62 (Union Co.); J. R. Schramm '85 (Hancock Co.); H. H. Whetzel '77 (near Avilla, Noble Co.).

**Chemistry:** (11) R. F. Bacon '80 (Muncie, Delaware Co.); G. L. Clark '92 (Anderson, Madison Co.); A. C. Cope '09 (Dunreith, Henry Co.); M. R. Fenske '04 (Michigan City, LaPorte Co.); C. A. Kraus '75 (Knightsville, Clay Co.); S. A. Lattimore '28 (Liberty, Union Co.); H. N. McCoy '70 (Richmond, Wayne Co.); W. A. Noyes, Jr. '98 (Terre Haute, Vigo Co.); L. I. Smith '91 (Indianapolis, Marion Co.); W. M. Stanley '04 (Ridgeville, Randolph Co.); H. W. Wiley '44 (Kent, Jefferson Co.)

**Geology:** (6) H. F. Bain '71 (Seymour, Jackson Co.); C. P. Berkey '69 (Goshen, Elkhart Co.); O. P. Hay '46 (Jefferson Co.); E. M. Kindle '69 (Franklin, Johnson Co.); P. B. King '03 (Richmond, Wayne Co.); F. B. Taylor '60 (Ft. Wayne, Allen Co.).

**Mathematics:** (4) O. E. Glenn '78 (Moorefield, Switzerland Co.); E. R. Hedrick '76 (Union City, Randolph Co.); D. N. Lehmer '67 (Somerset, Wabash Co.); J. B. Shaw '66 (Remington, Jasper Co.).

**Pathology:** (4) J. S. Billings '38 (Switzerland Co.); G. F. Dick '81 (Fort Wayne, Allen Co.); T. Francis, Jr. '00 (Gas City, Grant Co.); A. S. Warthin '66 (Greensburg, Decatur Co.).

**Physics:** (7) L. A. DuBridgE '01 (Terre Haute, Vigo Co.); A. L. Foley '67 (Hancock Co.); W. H. Furry '07 (Prairietown, Vigo Co.); E. Merritt '65 (Indianapolis, Marion Co.); W. B. Nottingham '99 (Tipton, Tipton Co.); J. O. Reed '56 (Newcastle, Henry Co.); H. C. Urey '93 (Walkerton, St. Joseph Co.).

**Physiology:** (3) R. Burton-Opitz '75 (Ft. Wayne, Allen Co.); C. W. Greene '66 (Crawford Co.); F. C. Mann '87 (Decatur, Adams Co.).

**Psychology:** (7) G. W. Allport '97 (Montezuma, Parke Co.); W. L. Bryan '60 (Bloomington, Monroe Co.); J. F. Dashiell '88 (Southport, Marion Co.); E. H. Lindley '69 (Paoli, Orange Co.); E. D. Starbuck '66 (Bridgeport, Marion Co.); C. P. Stone '92 (Portland, Jay Co.); L. M. Terman '77 (Johnson Co.).

**Zoology:** (19) W. C. Allee '85 (Bloomington, Parke Co.); B. M. Allen '77 (Greencastle, Putnam Co.); A. M. Banta '77 (Greenwood, Johnson Co.); G. N. Calkins '69 (Valparaiso, Porter Co.); C. Grave '70 (Monrovia, Morgan Co.); C. W. Hargitt '52 (Lawrenceburg, Dearborn Co.); G. T. Hargitt '81 (Fairfield, Franklin Co.); O. P. Hay '46 (Jefferson Co.); H. Heath '68 (Vevay, Switzerland Co.); W. T. Hornaday '54 (Plainfield, Hendricks Co.); C. Juday '71 (Ligonier, Noble Co.); C. H. Kennedy '79 (Rockport, Spencer Co.); W. L. McAtee '83 (Jalapa, Grant Co.); N. E. McIndoo '81 (Lyons, Greene Co.); W. J. Moenkhaus '71 (Huntingburg, DuBois Co.); F. Payne '81 (Shelbyville, Shelby Co.); J. Reighard '61 (LaPorte Co.); O. Riddle '77 (Crawford Co.); V. C. Twitty '01 (Martin Co.).

## LIST 2. STARRED COLLEGIATE ALUMNI OF INDIANA BY SCIENCE

**Anthropology:** *Earlham:* Goddard, P. E. '92; *Indiana:* Wissler, C. '97.

**Astronomy:** *Indiana:* Duncan, J. C. '05; Lampland, C. O. '02; Miller, J. A. '90; Slipher, E. C. '06; Slipher, V. M. '01. *Rose Polytechnic Inst.:* Parkhurst, J. A. '86; *Valparaiso:* Anderson, J. A. '00.

**Botany:** *DePauw:* MacDougal, D. T. '90; *Earlham:* Petry, L. D. '07; *Franklin:* Caldwell, O. W. '94; *Hanover:* Barnes, C. R. '77; Coulter, J. M. '70; Coulter, S. '77 *Indiana:* Bray, W. L. '93; Mottier, D. M. '91; *Purdue:* Bolley, H. L. '88; *Valparaiso:* LaRue, C. D. '10; *Wabash:* Moore, G. T. '94; Olive, E. W. '93; Reddick, D. '05; Rose, J. N. '85; Schramm, J. R. '10; Whetzel, H. H. '02.

**Chemistry:** *Butler:* Cope, A. C. '29; *DePauw:* Bacon, R. F. '99; Clark, G. L. '14; Fenske, M. R. '25; Lattimore, S. A. '50; *Earlham:* Howe, H. E. '01; Stanley, W. M. '26; Warder, R. B. '66; *Hanover:*

Wiley, H. W. '67; *Manchester*: Flory, P. J. '31; *Notre Dame*: Nieuwland, J. A. '99; *Purdue*: McCoy, H. N. '92; *Valparaiso*: Teeple, J. E. '93.

**Geology**: *Indiana*: Kindle, E. M. '93.

**Mathematics**: *Indiana*: Glenn, O. E. '02; *Purdue*: Shaw, J. B. '89.

**Pathology**: *Indiana*: Warthin, A. S. '88.

**Physics**: *DePauw*: Furry, W. H. '28; Longden, A. C. '81; Stewart, G. W. '98; Stewart, O. M. '92; *Indiana*: Brown, F. C. '04 Foley, A. L. '90; Knipp, C. T. '94; *Purdue*: Luckiesh, M. '09; Nottingham, W. B. '20; *Rose Polytech. Inst.*: Johonnott, E. S. '93; Mendenhall, C. E. '94.

**Physiology**: *Indiana*: Mann, F. C. '11; Pike, F. H. '03.

**Psychology**: *Earlham*: Mills, W. R. '08; *Evansville*: Dashiell, J. F. '08; *Indiana*: Bryan, Wm. L. '84; Lindley, E. H. '93; Starbuck, E. D. '90; Stone, C. P. '15; Terman, L. M. '02; *Valparaiso*: Stone, C. P. '10.

**Zoology**: *Butler*: Gilbert, C. H. '79; Twitty, V. C. '25; *DePauw*: Allen, B. M. '98; McFarland, F. M. '89; Riley, W. A. '97; *Earlham*: Allee, W. C. '08; Grave, C. '95; *Indiana*: Banta, A. M. '03; Edwards, C. L. '86; Eigenmann, C. H. '86; Evermann, B. W. '86; Juday, C. '96; Kennedy, C. H. '02; McAtee, W. L. '04 McIndoo, N. E. '06; Moenkhaus, W. J. '94; Payne, F. '05; Pike, F. H. '03; Riddle, O. '02.

### LIST 3. STARRED COLLEGIATE ALUMNI OF INDIANA SCHOOLS

**Butler**: (3) *Chemistry*: Cope, A. C. '29 \*7; *Zoology*: Gilbert, C. H. '79 \*1; Twitty, V. C. '25 \*6.

**DePauw**: (12) *Botany*: MacDougal, D. T. '90 \*1; *Chemistry*: Bacon, R. F. '99 \*3; Clark, G. L. '14 \*5; Fenske, M. R. '25 \*7; Lattimore, S. A. '50 \*1; *Physics*: Furry, W. H. '28 \*7; Longden, A. C. '81 \*1; Stewart, G. W. '98 \*1; Stewart, O. M. '92 \*1; *Zoology*: Allen, B. M. '98 \*2; McFarland, F. M. '89 \*1; Riley, W. A. '97 \*5.

**Earlham**: (8) *Anthropology*: Goddard, P. E. '92 \*3; *Botany*: Petry, L. D. '07 \*6; *Chemistry*: Howe, H. E. '01 \*3; Stanley, W. M. '26 \*7; Warder, R. B. '66 \*1; *Psychology*: Miles, W. R. '08 \*4; *Zoology*: Allee, W. C. '08 \*3; Grave, C. '95 \*1.

**Evansville**: (1) *Psychology*: Dashiell, J. F. '08 \*5.

**Franklin**: (1) *Botany*: Caldwell, O. W. '94 \*2.

**Hanover**: (4) *Botany*: Barnes, C. R. '77 \*1; Coulter, J. M. '70 \*1; Coulter, S. '77 \*1; *Chemistry*: Wiley, H. W. '67 \*1.

**Indiana**: (32) *Anthropology*: Wissler, C. '97 \*1; *Astronomy*: Duncan, J. C. '05 \*6; Lampland, C. O. '02 \*3; Miller, J. A. '90 \*3; Slipher, E. C. '06 \*5; Slipher, V. M. '01 \*3; *Botany*: Bray, W. L. '93 \*1; Mottier, D. M. '91 \*1; *Geology*: Kindle, E. M. '93 \*3; *Mathematics*:

Glenn, O. E. '02 \*3; *Pathology*: Warthin, A. S. '88 \*1; *Physics*: Brown, F. C. '04 \*3; Foley, A. L. '90 \*1; Knipp, C. T. '94 \*1; *Physiology*: Mann, F. C. '11 \*4; Pike, F. H. '03 \*3; *Psychology*: Bryan, Wm. L. '84 \*1; Lindley, E. H. '93 \*1; Starbuck, E. D. '90 \*2; Stone, C. P. '15 \*5; Terman, L. M. '02 \*3; *Zoology*: Banta, A. M. '03 \*3; Edwards, C. L. '86 \*1; Eigenmann, C. H. '86 \*1; Evermann, B. W. '86 \*2; Juday, C. '96 \*4; Kennedy, C. H. '02 \*7; McAtee, W. L. '04 \*6; McIndoo, N. E. '06 \*7; Moenkhaus, W. J. '94 \*2; Payne, F. '05 \*3; Pike, F. H. '03 \*3; Riddle, '02 \*3.

**Manchester:** (1) *Chemistry*: Flory, P. J. '31 \*7.

**Notre Dame:** (1) *Chemistry*: Nieuwland, J. A. '99 \*5.

**Purdue:** (5) *Botany*: Bolley, H. L. '88 \*1; *Chemistry*: McCoy, H. N. '92 \*2; *Mathematics*: Shaw, J. B. '89 \*1; *Physics*: Luckiesh, M. '09 \*3; Nottingham, W. B. '20 \*7.

**Rose Polytechnic Institute:** (3) *Astronomy*: Parkhurst, J. A. '86 \*2; *Physics*: Johannott, E. S. '93 \*2; Mendenhall, C. E. '94 \*1.

**Valparaiso:** (4) *Astronomy*: Anderson, J. A. '00 \*3; *Botany*: LaRue, C. D. '10 \*6; *Chemistry*: Teeple, J. E. '93 \*4; *Psychology*: Stone, C. P. '10 \*5.

**Wabash:** (6) *Botany*: Moore, G. T. '94 \*1; Olive, E. W. '93 \*2; Reddick, D. '05 \*3; Rose, J. N. '85 \*1; Schramm, J. R. '10 \*3; Whetzel, H. H. '02 \*3.

LIST 4. STARRED COLLEGIATE ALUMNI  
By School and Year of Graduation

**Butler:** (3) 1879 Gilbert; 1925 Twitty; 1929 Cope.

**Depauw:** (12) 1850 Lattimore; 1881 Longden; 1889 McFarland; 1890 MacDougal; 1892 Stewart, O. M.; 1897 Riley; 1898 Allen; Stewart, G. W.; 1899 Bacon; 1914 Clark; 1925 Fenske; 1928 Furry.

**Earlham:** (8) 1866 Warder; 1892 Goddard; 1895 Grave; 1901 Howe; 1907 Petry; 1908 Allee; Miles; 1926 Stanley.

**Evansville:** (1) 1908 Dashiell.

**Franklin:** (1) 1894 Caldwell.

**Hanover:** (4) 1867 Wiley; 1870 Coulter, J. M.; 1877 Barnes; Coulter, S.

**Indiana:** (32) 1884 Bryan; 1886 Edwards; Eigenmann; Evermann; 1888 Warthin; 1890 Foley; Miller; Starbuck; 1891 Mottier; 1893 Bray; Kindle; Lindley; 1894 Knipp; Moenkhaus; 1896 Juday; 1897 Wissler; 1901 Slipher, V. M.; 1902 Glenn; Kennedy; Lampland; Riddle; Terman; 1903 Banta; Pike; 1904 Brown; McAtee; 1905 Duncan; Payne; 1906 McIndoo; Slipher, E. C.; 1911 Mann; 1915 Stone.

**Manchester:** (1) 1931 Flory.

**Notre Dame:** (1) 1899 Nieuwland.

**Purdue:** (5) 1888 Bolley; 1889 Shaw; 1892 McCoy; 1909 Luckiesh; 1920 Nottingham.

**Rose Polytechnic Institute:** (3) 1886 Parkhurst; 1893 Johnnott; 1894 Mendenhall.

**Valparaiso:** (4) 1893 Teeple; 1900 Anderson; 1910 LaRue; Stone.

**Wabash** (6) 1885 Rose; 1893 Olive; 1894 Moore; 1902 Whetzel; 1905 Reddick; 1910 Schramm.

#### LIST 5. STARRED COLLEGIATE ALUMNI OF INDIANA BY CLASS

1850 Lattimore, S. A. 1866 Warder, R. B. 1867 Wiley, H. W. 1870 Coulter, J. M. 1877 Barnes, C. R.; Coulter, S. 1879 Gilbert, C. H. 1881 Longden, A. C. 1884 Bryan, Wm. L. 1885 Rose, J. N.; 1886 Edwards, C. L.; Eigenmann, C. H.; Evermann, B. W.; Parkhurst, J. A. 1888 Bolley, H. L.; Warthin, A. S. 1889 McFarland, F. M.; Shaw, J. B. 1890 Foley, A. L.; MacDougal, D. T.; Miller, J. A. Starbuck, E. D. 1891 Mottier, D. M. 1892 Goddard, P. E.; McCoy, H. N.; Stewart, O. M. 1893 Bray, W. L.; Johnnott, E. S.; Kindle, E. M.; Lindley, E. H.; Olive, E. W.; Teeple, J. E. 1894 Caldwell, O. W.; Knipp, C. T.; Mendenhall, C. E.; Moenkhaus, W. J.; Moore, G. T. 1895 Grave, C. 1896 Juday, C. 1897 Riley, W. A.; Wissler, C. 1898 Allen, B. M.; Stewart, G. W.

1899 Bacon, R. F.; Nieuwland, J. A. 1900 Anderson, J. A. 1901 Howe, H. E.; Slipher, V. M. 1902 Glenn, O. E.; Kennedy, C. H.; Lampland, C. O.; Riddle, O.; Terman, L. M.; Whetzel, H. H. 1903 Banta, A. M.; Pike, F. H. 1904 Brown, F. C.; McAtee, W. L. 1905 Duncan, J. C.; Payne, F.; Reddick, D. 1906 McIndoo, N. E.; Slipher, E. C. 1907 Petry, L. D. 1908 Allee, W. C.; Dashiell, J. F.; Miles, W. R. 1909 Luckiesh, M. 1910 LaRue, C. D.; Schramm, J. R.; Stone, C. P. 1911 Mann, F. C. 1914 Clark, G. L. 1915 Stone, C. P. 1920 Nottingham, W. B. 1925 Fenske, M. R.; Twitty, V. C. 1926 Stanley, W. M. 1928 Furry, W. H. 1929 Cope, A. C. 1931 Flory, P. J.

Before 1870 3; 1870's 4; 1880-84 2; 1885-89 9; 1890-94 19; 1895-99 8; 1900-04 12; 1905-09 10; 1910-14 5; 1915-19 0; 1920-24 1; 1925-29 4; 1930-1.

Every year 1884-1914 had 1 to 6.

Since 1914 only 7 have graduated, 6 of them 1915-1931.

The high years were 1893 and 1902, 6 each; 1894 5, in 1886 and 1890 4, and 3 each in 1905, 1908, 1910.

#### LIST 6. STARRED SCIENTISTS BORN IN INDIANA

Arranged Alphabetically; Year of Birth

Allee, W. C. '85; Allen, B. M. '77; Allport, G. W. '97; Bacon, R. F. '80; Bain, H. F. '71; Banta, A. M. '77; Barnes, C. R. '58; Berkey, C. P. '67;

Billings, J. S. '38; Bolley, H. L. '65; Bryan, W. L. '60; Burton-Opitz, R. '75; Caldwell, O. W. '69; Calkins, G. N. '69; Clark, G. L. '92; Cope, A. C. 1909; Dashiell, J. F. '88; Dick, G. F. '81; Doolittle, C. L. '43; DuBridge, L. A. 1901; Duncan, J. C. '82; Fenske, M. R. 1904; Fitzpatrick, H. M. '86; Foley, A. L. '67; Francis, T., Jr. 1900; Furry, W. H. 1907; Glenn, O. E. '78; Grave, C. '70; Greene, C. W. '66; Hargitt, C. W. '52; Hargitt, G. T. '81; Harvey, R. B. '90; Hay, O. P. '46; Heath, H. '68; Hedrick, E. R. '76; Hornaday, W. T. '54.

Juday, C. '71; Kennedy, C. H. '79; Kindle, E. M. '69; King, P. B. 1903; Kraus, C. A. '75; Kuntz, A. '79; Lattimore, S. A. '28; Lehmer, D. N. '67; Lindley, E. H. '69; MacDougal, D. T. '65; Mann, F. C. '87; McAtee, W. L. '83; McCoy, H. N. '70; McIndoo, N. E. '81; Merritt, E. '65; Miller, J. A. '59; Moenkhaus, W. J. '71; Mooney, J. '61; Moore, G. T. '71; Mottier, D. M. '64; Nottingham, W. B. '99; Noyes, W. A., Jr. '98; Olive, E. W. '70; Payne, F. '81; Reed, J. O. '56; Reighard, J. '61; Riddle, O. '77; Rose, J. N. '62; Schramm, J. R. '85; Shaw, J. B. '66; Slipher, E. C. '83; Slipher, V. M. '75; Smith, L. I. '91; Stanley, W. M. 1904; Starbuck, E. D. '66; Stone, C. P. '92; Taylor, F. B. '60; Terman, L. M. '77; Twitty, V. C. 1901; Urey, H. C. '93; Warthin, A. S. '66; Whetzel, H. H. '77; Wiley, H. W. '44; Windle, W. F. '98; Wissler, C. '70.

#### LIST 7. STARRED SCIENTISTS BORN IN INDIANA

##### Arranged by Counties

*Adams*: Mann; *Allen*: Burton-Opitz, Dick, Taylor; *Boone*: Caldwell, Olive; *Clay*: Kraus; *Clinton*: Slipher, E. C. and V. M.; *Crawford*: Greene, Riddle; *Dearborn*: Bolley, Hargitt, C. W.; *Decatur*: Miller, Warthin; *Delaware*: Bacon; *Dubois*: Moenkhaus; *Elkhart*: Berkey; *Franklin*: Hargitt, G. T.; *Grant*: Francis, McAtee; *Greene*: McIndoo; *Hancock*: Duncan, Foley, Schramm; *Hendricks*: Hornaday; *Henry*: Cope, Reed; *Huntington*: Windle; *Jackson*: Bain; *Jasper*: Shaw; *Jay*: Stone; *Jefferson*: Barnes, Hay, Wiley; *Johnson*: Banta, Fitzpatrick, Kindle, Terman; *LaGrange*: Doolittle; *LaPorte*: Fenske, Reighard; *Madison*: Clark; *Marion*: Dashiell, Merritt, Moore, Smith, Starbuck; *Martin*: Twitty; *Monroe*: Bryan; *Morgan*: Grave, Harvey; *Noble*: Juday, Whetzel; *Orange*: Lindley; *Parke*: Allee, Allport; *Porter*: Calkins; *Putnam*: Allen; *Randolph*: Hedrich, Stanley; *Ripley*: Kuntz; *St. Joseph*: Urey; *Shelby*: Payne; *Spencer*: Kennedy; *Switzerland*: Billings, Glenn, Heath, Mottier; *Tipton*: Nottingham; *Union*: Lattimore, MacDougal, Rose; *Vigo*: DuBridge, Furry, Noyes; *Wabash*: Lehmer; *Wayne*: King, McCoy, Mooney, Wissler.

#### LIST 8. STARRED SCIENTISTS WHO CAME TO INDIANA FOR THEIR COLLEGE DEGREES

Anderson, J. A.; Bray, W. L.; Brown, F. C.; Coulter, J. M.; Coulter, Stanley; Edwards, C. L.; Eigenmann, C. H.; Everman, B. W.; Flory, P. J.; Gilbert, G. H.; Goddard, P. E.; Johonnott, E. S.; Howe, H. E.; Knipp, C. T.; Lampland, C. O.; LaRue, C. D.; Longden, A. C.; Luckiesh,

M.; McFarland, F. M.; Mendenhall, C. E.; Miles, W. R.; Nieuwland, J. A.; Parkhurst, J. A.; Petry, L. D.; Pike, F. H.; Reddick, D.; Riley, W. A.; Stewart, G. W.; Stewart, O. M.; Teeple, J. E.; Warder, R. B.

### Summary and Conclusions

Indiana was the native state of 81 scientists starred in the biographical directory, "American Men of Science," (by secret vote of their fellow scientists) as especially distinguished in research. Each of the 12 sciences in which starring has been done have had 2 or more representatives born in Indiana; zoology had 19, botany 12, chemistry 11, physics 7, geology 6, psychology 6, astronomy 5, mathematics and pathology 4 each, physiology 3, and anatomy and anthropology 2 each. For 7 sciences, Indiana surpassed more than three-fourths of the 48 states in the yield of starred scientists per million of population at about the date of their birth. For 3 sciences (anatomy, chemistry and mathematics) it surpassed two-thirds of the states and it stood only a little lower for geology. Only for physics was it surpassed by slightly more than half of the states.

The birthplaces of these scientists are very unequally distributed over the state. In brief, of those born before 1880, the southeastern part of the state led by a wide margin, but of those born since 1880 the southern part of the state yielded few. Contrasts among the counties and sections of the state are presented in some detail, and several possible explanations of the contrasts are offered.

Indiana institutions conferred college degrees upon 81 subsequently starred scientists, 31 of whom were born elsewhere. By institutions Indiana University graduated 32, DePauw 12, Earlham 8, Wasbush 6, Purdue 5, Hanover and Valparaiso 4, Butler and Rose 3, and Evansville, Franklin, Manchester, and Notre Dame 1 each. Considerable evidence, summarized in the paper, indicates that personal encouragement by enthusiastic, stimulating teachers was an important influence in the output of subsequently starred scientists. For example, 13 of the 19 zoologists were students of David Starr Jordan or of men started by him. In addition, several of Dr. Jordan's students were starred in other sciences. Of the 16 botanists, about 10 were students of John Merle Coulter or of students of his. John A. Miller trained most of the astronomers. W. M. Blanchard trained 2 of the chemists. Conversely, despite very large enrollments in chemistry for many decades, only one Purdue alumnus has been starred in chemistry and none from Indiana University. This suggests that large classes, sort of mass production methods, are not conducive to stimulating young people to become scholars. What is needed in addition to able students is individual attention and personal encouragement.