

Highly Cited Articles. 37. Biomedical Articles  
Published in the 1940s.

Number 13, March 28, 1977

In recent weeks we have listed still highly-cited articles of the 1940s from the fields of biochemistry and physics. Here we conclude our survey of the 1940s with a list of biomedical articles. Each was cited at least 150 times in the period 1961-1975. The average is about 325 times. Most were cited more than that, and are still being cited heavily after three decades. On the average each article was cited 23 times in both 1974 and 1975. This is more than ten times the citation rate for the average article cited in one year of the *Science Citation Index*<sup>®</sup>. Indeed, it is ten times the expected rate of citation for the five year *Science Citation Index* cumulative!

Figure 1 shows the 54 journals in which the articles appeared. Seven journals account for about a third: *American Journal of Physiology* (6); *Journal of Biological Chemistry* and *Proceedings of the Society for Experimental Biology and Medicine* (both 5); *Anatomical Record*, *Journal of Clinical Investigation*, *Journal of General Physiology*, and *Science* (4 each). It should be noticed that most of the journals listed in Figure 1 have impacts well

above average.

Ten of the 104 articles were authored or coauthored by Nobelists: Cournand and Richards, who shared the 1956 prize for medicine (articles 9 and 39); Beadle and Tatum, who shared the prize for medicine in 1958 (article 12); A.V. Hill, 1922 laureate for medicine (article 43); A.L. Hodgkin, laureate for medicine in 1963 (articles 44 and 45); B. Katz, laureate for medicine in 1970 (article 44); G.E. Palade, laureate for medicine in 1974 (article 46); Luria and Delbruck, who shared the prize for medicine in 1969 (article 63); Sir Peter Medawar, who won the medical prize in 1960 (article 64); and Linus Pauling, laureate in chemistry in 1954 (article 73). Pauling is on the list with a medical-research paper concerning the etiology of sickle cell anemia.

The articles are listed alphabetically by first author in Figure 2. The list shows total citations for the period 1961-1975, average citations per year, and citation counts for the years 1974 and 1975. It is striking to find that about 60 of these 104 articles have citation counts for 1974 and/or 1975 that matched or exceeded their yearly

Figure 1. Journals that published the highly cited 1940s articles listed in Figure 2. A = number of articles. B = 1974 impact factor. (Present titles of journals are given in parentheses.)

A	B	Journal	A	B	Journal
1	1.042	Acta Chem. Scand.	2	3.737	J. Cell Comp. Physiology (J. Cell. Physiology)
1	1.124	Acta Med. Scand.	3	5.170	J. Clin. Endocrinol. Metab.
2	0.809	Acta Path. Microb. Scand.	4	6.992	J. Clin. Invest.
2	2.204	Acta Physiol. Scand.	2	11.874	J. Exp. Med.
2	1.791	Amer. Heart J.	1	1.027	J. Exp. Psychology
2	1.378	Amer. J. Botany	1	1.412	J. Exp. Zoology
2	1.348	Amer. J. Clin. Pathol.	2	2.160	J. Gen. Microbiology
1	4.411	Amer. J. Med.	4	4.308	J. Gen. Physiology
2	2.807	Amer. J. Pathology	1	5.112	J. Immunology
6	2.414	Amer. J. Physiology	1	2.802	J. Lab. Clin. Med.
1	1.264	Amer. J. Psychiatry	3	3.289	J. Nat. Cancer Inst.
4	2.884	Anatomical Record	1	4.537	J. Neurophysiology
1	1.181	Ann. New York Acad. Sci.	2	1.816	J. Pathol. Bacteriol. (J. Pathol.; J. Med. Microbiol.)
1	2.792	Arch. Exp. Path. Pharm. (Naunyn-Schmiedebergs Arch.)	2	3.576	J. Pharmacol. Exp. Ther.
1	1.521	Arch. Pathology	2	4.495	J. Physiology
3	3.627	Biochemical Journal	2	4.188	Medicine
1	3.120	Biochim. Biophys. Acta	1	3.636	Nature
1	0.813	Biometrics	1	9.577	Pharmacol. Reviews
3	3.516	Brit. J. Pharmacology	1	13.861	Physiol. Reviews
1	--	Bull. Amer. Mus. Nat. Hist.	1	8.989	Proc. Nat. Acad. Sci. USA
1	1.498	EEG Clin. Neurology	3	2.493	Proc. Roy. Soc. London B
3	4.337	Endocrinology	5	1.471	Proc. Soc. Exp. Biol. Med.
1	5.394	Gastroenterology	1	4.156	Psychol. Reviews
1	2.835	Genetics	4	5.412	Science
1	1.015	J. Abnormal Soc. Psychol.	1	--	Trans. Ophth. Soc. Australia
1	3.068	J. Amer. Med. Assoc.	1	1.953	Zschr. Zellforsch. Mikr. Anat.
1	1.284	J. Anatomy			
5	5.843	J. Biol. Chemistry			

averages. The most astonishing in this respect is article 79 by G. Scatchard. This article on the attractions of proteins for molecules and ions was published in 1949. From 1961 to 1964 it was cited only 45 times. Every year thereafter it has been cited more frequently--about 40 times a year in

1965-1969; about 130 times a year in 1970-1972; and about 310 times a year 1973-1975. Its count of 352 for 1975--almost thirty years after publication--is in fact its highest yet. Hopefully we can get the author to comment on this citation classic one day.

The most frequently cited paper

(article 61), by Litchfield and Wilcoxon, was cited 2,238 times from 1961 to 1975. Its average yearly citation rate for those years is 149. Like the paper by Scatchard, its citation rate has increased in 1974 and 1975. We recently published Litchfield's commentary on this citation classic.<sup>1</sup> In this week's *Citation Classics* Selye comments upon his classic paper (number 82), which I've discussed before.<sup>2</sup>

Current researchers in the field of biomedicine constantly refer back to these papers published over 30 years ago. Time has failed to decrease the significance of these papers, clearly reflected in their increasing citation counts. One should keep in mind, however, that often times there is a comparable if not greater failure to cite such well-known papers by those who are entitled to take them for granted as part of the common wisdom of their field. Another detail to keep in mind for a paper like number 41 (Harlow on learning sets), is that our coverage of psychology was not as complete in the early years of the *Science Citation Index*. Furthermore, there is a distinct possibility that the citation count for this paper will increase when we include data from the *Social Sciences Citation Index*. The appearance of a paper like number 85 (Simpson on classification)

brings up an important point to remember. The *Bulletin of the American Museum of Natural History* is not a journal one would ordinarily expect to find on these lists. It is important to observe why.

I have observed elsewhere that the size of a particular field is not the main determinant in the average citation rate. Rather the number of references cited in the average paper is significant. But certainly the size of a field will influence the number of papers that achieve any arbitrary citation threshold. There could never have been 50,000 formal citations of the Lowry method had there not been several hundred thousand papers published on this subject. The entire literature of certain small fields may consist of only one or two thousand papers--or even less. From this it should be obvious that citation frequency is a relative measure. Thus, no comparison between any of the papers on this list is intended. Further, it is certain that other papers published in the forties, but not mentioned on this list would probably turn up were we able to have access to citation indexes for that period. It is a matter of considerable interest to science historians to know whether paper number 7 by Avery et al. was heavily cited in the forties and fifties.

#### REFERENCES

1. Litchfield J T. *Citation Classics*. A simplified method of evaluating dose-effect experiments. *Current Contents*<sup>®</sup> No. 7, 14 February 1977, p. 8.
2. Garfield E. Citation indexes for science. A new dimension in documentation through association of ideas. *Science* 122:108-11, 1955.

**Figure 2. Highly cited articles in biological sciences and medicine published in the 1940s. A = item number. B = total citations 1961-1975. C = average yearly citations 1961-1975. D = citations in 1974. E = citations in 1975. Articles are listed alphabetically by first author**

A	B	C	D	E	Bibliographic Data
1.	247	16	21	30	Abercrombie M. Estimation of nuclear population from microtome sections. <i>Anatomical Record</i> 94:239-47, 1946.
2.	1198	79	69	62	Ahlquist R P. A study of the adrenotropic receptors. <i>Amer. J. Physiol.</i> 153:586-600, 1948.
3.	163	10	12	18	Alexander R S. Tonic and reflex functions of medullary sympathetic cardiovascular centers. <i>J. Neurophysiology</i> 9:205-17, 1946.
4.	252	16	21	16	Anderson E H. Growth requirements of virus-resistant mutants of <i>Escherichia coli</i> strain "B". <i>Proc. Nat. Acad. Sci. USA</i> 32:120, 1946.
5.	214	14	10	10	Andrews C H & Horstmann D M. The susceptibility of viruses to ethyl ether. <i>J. Gen. Microbiology</i> 3:290-7, 1949.
6.	157	10	16	14	Asch S E. Forming impressions of personality. <i>J. Abnorm. Soc. Psychol.</i> 41:258-90, 1946.
7.	242	16	12	10	Avery O T, MacLeod C & McCarty M. Studies on the chemical nature of the substance inducing transformation of pneumococcal types. <i>J. Exp. Med.</i> 79:137-58, 1944.
8.	224	14	16	17	Bailey K. Tropomyosin; a new asymmetric protein component of the muscle fibril. <i>Biochem. J.</i> 43:271-79, 1948.
9.	426	28	18	12	Baldwin E D, Coumand A & Richards D W. Pulmonary insufficiency. <i>Medicine</i> 27:243-78, 1948.
10.	205	13	5	17	Bargmann W. Über die neurosekretorische Verknüpfung von Hypothalamus und Neurohypophyse ( <i>Neurosecretory linkage of hypothalamus and pituitary</i> ). <i>Zschr. Zellforsch. Mikrosk. Anat.</i> 34:610-34, 1949.
11.	314	20	11	13	Barr M L & Bertram E G. A morphological distinction between neurones of the male and female, and the behavior of the nucleolar satellite during accelerated nucleoprotein synthesis. <i>Nature</i> 163:676-77, 1949.
12.	247	16	15	8	Beadle G W & Tatum E L. <i>Neurospora</i> . 2. Methods of producing and detecting mutations concerned with nutritional requirements. <i>Amer. J. Botany</i> 32:678-86, 1945.
13.	257	17	14	9	Bean J W. Effects of oxygen at increased pressure. <i>Physiol. Revs.</i> 25:1-147, 1945.
14.	390	26	20	24	Bollman F L, Cain J C, Grindley J H & VanHook E. Techniques for the collection of lymph from the liver, small intestine, or thoracic duct of the rat. <i>J. Lab. Clin. Med.</i> 33:1349-52, 1948.
15.	272	18	10	8	Boyle P J & Conway E J. Potassium accumulation in muscle and associated changes. <i>J. Physiology</i> 100:1-63, 1941.
16.	252	16	18	17	Bradley S E, Ingelfinger F J, Bradley G P & Curry J J. The estimation of hepatic blood flow in man. <i>J. Clin. Invest.</i> 24:890-97, 1945.
17.	264	17	20	22	Bucher T. Ueber ein phosphatübertragendes Gärungsferment (On a phosphate-transporting respiratory enzyme). <i>Biochim. Biophys. Acta</i> 1:292-314, 1947.
18.	395	26	45	22	Bulbring E. Observations on the isolated phrenic nerve diaphragm preparation of the rat. <i>Brit J. Pharmacology</i> 1:38-61, 1946.
19.	354	23	33	31	Chalkey H W. Method for the quantitative morphologic analysis of tissues. <i>J. Nat. Cancer Inst.</i> 4:47-53, 1943.
20.	197	13	8	10	Chase M W. The cellular transfer of cutaneous hypersensitivity to tuberculin. <i>Proc. Soc. Exp. Biol. Med.</i> 59:134-5, 1945.

Figure 2 (cont.)

21	207	13	6	11	Coons A H, Joner R N & Berliner E. The demonstration of pneumococcal antigen in tissues by the use of fluorescent antibody. <i>J. Immunology</i> 45:159-70, 1942.
22	156	10	10	13	Dietrick J E, Whedon G D & Shorr E. Effects of immobilization upon various metabolic and physiologic functions of normal men. <i>Amer. J. Med.</i> 4:3-36, 1948.
23	281	18	14	12	Duguid J B. Thrombosis as a factor in the pathogenesis of coronary atherosclerosis. <i>J. Pathol. Bacteriol.</i> 58:207-12, 1946.
24	167	11	12	20	Eadie G S. The inhibition of cholinesterase by physostigmine and prosgmine. <i>J. Biol. Chem.</i> 146:85-93, 1942.
25	527	35	35	34	Earle W R, Schilling E L, Stark T H, Straus N P, Brown M F & Shelton E. Production of malignancy <i>in vitro</i> . 4. The mouse fibroblast cultures and changes seen in the living cells. <i>J. Nat. Cancer Inst.</i> 4:165-212, 1943.
26	256	17	17	13	Estes W K & Skinner B F. Some quantitative properties of anxiety. <i>J. Exp. Psychol.</i> 29:390-400, 1941.
27	158	10	17	16	Everett J W. Progesterone and estrogen in the experimental control of ovulation time and other features of the estrous cycle in the rat. <i>Endocrinology</i> 43:389-405, 1948.
28	195	13	13	4	Friedman M & Freed S C. Microphonic manometer for indirect determination of systolic blood pressure in the rat. <i>Proc. Soc. Exp. Biol. Med.</i> 70:670-72, 1949.
29	219	14	4	6	Fulton F & Dumbell K R. The serological comparison of strains of influenza virus. <i>J. Gen. Microbiology</i> 3:97-111, 1949.
30	200	13	17	18	Gall E A & Mallory T B. Malignant lymphoma; a clinicopathologic survey of 618 cases. <i>Amer. J. Pathol.</i> 18:381-415, 1942.
31	520	34	41	67	Goldman D E. Potential, impedance, and rectification in membranes. <i>J. General Physiology</i> 27:37-59, 1943.
32	188	12	15	13	Goldstein A. The interactions of drugs and plasma proteins. <i>Pharmacol. Revs.</i> 1:102-65, 1949.
33	300	20	10	17	Gomori G. Observations with differential stains on human islets of Langerhans. <i>Amer. J. Pathology</i> 17:395-406, 1941.
34	168	11	12	11	Gomori G. The distribution of phosphatase in normal organs and tissues. <i>J. Cell. Comp. Physiol.</i> 17:71-84, 1941.
35	175	11	7	12	Gomori G. Distribution of acid phosphatase in the tissues under normal and under pathologic conditions. <i>Arch. Pathol.</i> 32:189-99, 1941.
36	241	16	21	12	Greenspan F S. Bioassay of hypophyseal growth hormone; the tibia test. <i>Endocrinology</i> 45:455-63, 1949.
37	554	23	19	18	Gregg N M. Congenital cataract following German measles in the mother. <i>Trans. Ophthalmol. Soc. Australia</i> 3:35-46, 1941.
38	218	14	9	9	Hahn P F. Abolishment of alimentary lipemia following injection of heparin. <i>Science</i> 98:19-20, 1943.
39	189	12	6	3	Hamilton W F, Riley R L, Attyah A H, Courmand A, Fowell D M, Himmelstein A, Noble R P, Remington J W, Richards D W, Wheeler N C & Witham A C. Comparison of the Fick and dye injection methods of measuring the cardiac output in man. <i>Amer. J. Physiol.</i> 153:309-21, 1948.
40	531	35	54	44	Hanks J H & Wallace R E. Relation of oxygen and temperature in the preservation of tissues by refrigeration. <i>Proc. Soc. Exp. Biol. Med.</i> 71:196-200, 1949.
41	195	13	9	11	Harlow H F. The formation of learning sets. <i>Psychol. Review</i> 56:51-65, 1949.
42	235	15	11	13	Hegsted D M, Mills R C, Elvehjew C A & Hart E B. Choline in the nutrition of chicks. <i>J. Biol. Chem.</i> 138:459-66, 1941.
43	230	15	8	11	Hill A V. The abrupt transition from rest to activity in muscle. <i>Proc. Roy Soc. London B</i> 136:399-420, 1949.

Figure 2 (cont.)

44. 709 47 58 52 Hodgkin A I & Katz B. The effect of sodium ions on the electrical activity of the giant axon of the squid. *J. Physiology* 108:37-77, 1949.
45. 256 17 15 18 Hodgkin A I & Rushton W A H. The electrical constants of a crustacean nerve fiber. *Proc. Roy. Soc. London B* 133:444-79, 1946.
46. 361 24 11 18 Hogeboom G H, Schneider W C & Palade G E. Cytochemical studies of mammalian tissues. 1. Isolation of intact mitochondria from rat liver; some biochemical properties of mitochondria and submicroscopic particulate material. *J. Biol. Chem.* 172:619-36, 1948.
47. 154 10 2 10 Holmberg C G & Laurell C B. Investigations of serum copper. 2. Isolation of the copper containing protein, and a description of some of its properties. *Acta Chem. Scand.* 2:550-56, 1948.
48. 341 22 22 21 Holton P & Kennedy C R. The treatment of experimental tuberculosis with sulphetrone. *Brit. J. Pharmacology* 3:29-36, 1948.
49. 373 24 29 14 Kekwick R A. The serum proteins in multiple myelomatosis. *Biochem. J.* 34:1248-57, 1940.
50. 267 17 21 13 Kety S S. Measurement of regional circulation by the local clearance of radioactive sodium. *Amer. Heart J.* 38:321-8, 1949.
51. 228 15 13 12 Kety S S & Schmidt C F. The determination of cerebral blood flow in man by the use of nitrous oxide in low concentrations. *Amer. J. Physiology* 143:53-66, 1945.
52. 443 29 16 23 Kety S S & Schmidt C F. The effects of altered arterial tensions of carbon dioxide and oxygen on cerebral blood flow and cerebral oxygen consumption of normal young men. *J. Clin. Invest.* 27:484-92, 1948.
53. 403 26 24 26 Kety S S & Schmidt C F. The nitrous oxide method for the quantitative determination of cerebral blood flow in man; theory, procedure and normal values. *J. Clin. Invest.* 27:476-83, 1948.
54. 240 16 7 10 Klinefelter H F, Albright F & Griswold G C. Experience with a quantitative test for normal or decreased amounts of follicle-stimulating hormone in the urine in endocrinological diagnosis. *J. Clin. Endocrinology* 3:529-44, 1943.
55. 234 15 25 17 Konzett H & Rossler R. Versuchsanordnung zu Untersuchung an der Bronchialmuskulatur (Experimental procedure in studies of the bronchial musculature). *Arch. Exp. Path. Pharmacol.* 195:71-74, 1940.
56. 881 58 68 61 Kunitz M. Crystalline soybean trypsin inhibitor. 2. General properties. *J. General Physiology* 30:291-320, 1947.
57. 277 18 13 14 Leblond C P & Stevens C E. The constant renewal of the intestinal epithelium in the albino rat. *Anatomical Record* 10:357-71, 1948.
58. 156 10 17 16 Lindemann E. Symptomatology and management of grief. *Amer. J. Psychiatry* 101:141-8, 1944.
59. 255 17 10 10 Ling G & Gerard G L. The normal membrane potential of frog sartorius fibers. *J. Cell. Comp. Physiol.* 34:383-96, 1949.
60. 206 13 28 20 Litchfield J T. A method for rapid graphic solution of time-per cent effect curves. *J. Pharmacol. Exp. Ther.* 97:399-408, 1949.
61. 2238 149 190 186 Litchfield J T Jr & Wilcoxon F A. A simplified method of evaluating dose-effect experiments. *J. Pharmacol. Exp. Ther.* 96:99-113, 1949.
62. 246 16 10 6 Long C N H, Katzin B & Fry E G. The adrenal cortex and carbohydrate metabolism. *Endocrinology* 26:309-44, 1940.
63. 238 15 26 21 Luria S E & Delbruck M. Mutations of bacteria from virus sensitivity to virus resistant. *Genetics* 28:491-511, 1943.
64. 207 13 9 7 Medawar P B. The behavior and fate of skin autographs and skin homographs in rabbits. *J. Anatomy* 78:176-99, 1944.

Figure 2 (cont.)

65. 180 12. 29 20 Meris J K. The effect of changes in the calcium content of the cerebrospinal fluid on spinal reflex activity in the dog. *Amer. J. Physiology* 131:67-72, 1940.
66. 487 32 49 32 Miller L C & Tainter M L. Estimation of the ED<sup>50</sup> and its error by means of logarithmic-probit graph paper. *Proc. Soc. Exp. Biol. Med.* 57:261-4, 1944.
67. 190 12 11 6 Mirsky A E & Pollister A W. Chromosin, a desoxyribose nucleoprotein complex of the cell nucleus. *J. General Physiol* 30:117-47, 1946.
68. 603 40 26 45 Moruzzi G & Magoun H W. Brain stem reticular formation and activation of the EEG. *Electroencephalography Clin. Neurol.* 1:455-73, 1949.
69. 839 55 50 75 Ouchterlony O. Antigen-antibody reactions in gels. *Acta. Path. Microb. Scand.* 26:507-15, 1949.
70. 497 33 36 25 Ouchterlony O. *In vitro* method for testing the toxin-producing capacity of diphtheria bacteria. *Acta Path. Microb. Scand.* 25:186-91, 1948.
71. 183 12 10 4 Owen R D. Immunogenetic consequences of vascular anastomoses between bovine twins. *Science* 102:400-01, 1945.
72. 204 13 26 12 Pappenheimer J R & Soto-Rivera A. Effective osmotic pressure of the plasma and other quantities associated with the capillary circulation in the hindlimbs of cats and dogs. *Amer. J. Physiology* 152:471-91, 1948.
73. 279 18 19 19 Pauling L, Itano H A, Singer S J & Wells I C. Sickle cell anemia, a molecular disease. *Science* 110:543-48, 1949.
74. 198 13 13 8 Reifensstein E C, Albright F & Wells S L. The accumulation, interpretation, and presentation of data pertaining to metabolic balances, notably those of calcium, phosphorus, and nitrogen. *J. Clin. Endocrinol.* 5:367-95, 1945.
75. 197 13 10 7 Robinson J R. Some effects of glucose and calcium upon the metabolism of kidney slices from adult and newborn rats. *Biochem. J.* 45:68-74, 1949.
76. 289 19 11 5 Rocha e Silva M, Beraldo W T & Rosenfeld G. Bradykinin, a hypotensive and smooth muscle stimulating factor released from plasma globulin by snake venoms and by trypsin. *Amer. J. Physiology* 156:261-73, 1949.
77. 205 13 15 13 Sabin A B & Feldman H A. Dyes as microchemical indicators of a new immunity phenomenon affecting a protozoan parasite (*Toxoplasma*). *Science* 108:660-63, 1948.
78. 234 15 13 8 Sanford K K, Earle W R & Likely D. The growth *in vitro* of single isolated tissue cells. *J. Nat. Cancer Inst.* 9:229-46, 1948.
79. 1575 105 329 352 Scatchard G. The attractions of proteins for small molecules and ions. *Ann. New York Acad. Sci.* 51:660-72, 1949.
80. 270 18 24 19 Schild H O. pA, a new scale for the measurement of drug antagonism. *Brit. J. Pharmacol.* 2:189-206, 1947.
81. 202 13 4 2 Schwert G W, Neurath H, Kaufman S & Snoke J E. The specific esterase activity of trypsin. *J. Biol. Chem.* 172:221, 1948.
82. 167 11 5 6 Selye H. The general adaptation syndrome and the diseases of adaptation. *J. Clin. Endocrinol.* 6:117-230, 1946.
83. 289 19 30 24 Shay H, Komorov S A, Fels S S, Meranze D, Gruenstein M & Sipler H. A simple method for the uniform productions of gastric ulceration in the rat. *Gastroenterology* 5:43-61, 1945.
84. 209 13 18 12 Shumway W. Stages in the normal development of *Rana pipiens*. 1. External form. *Anatomical Record* 78:139-48, 1940.
85. 209 13 14 17 Simpson G G. The principles of classification and a classification of mammals. *Bull. Amer. Mus. Nat. Hist.* 85:1-350, 1945.

Figure 2 (cont.)

86. 352 23 7 5 Singer R B & Hastings A B. An improved clinical method for the estimation of disturbances of the acid-base balance of human blood. *Medicine* 27:223-42, 1948.
87. 782 52 41 39 Smith H W, Finklestein N, Aliminoso L, Crawford B & Grabar M. The renal clearances of substituted hippuric acid derivatives and other aromatic acids in dog and man. *J. Clin. Invest.* 24:388-404, 1945.
88. 182 12 6 9 Sokolow M & Lyon T P. The ventricular complex in left ventricular hypertrophy as obtained by unipolar precordial and limb leads. *Amer. Heart J.* 37:161-86, 1949.
89. 237 15 25 27 Steinbrocker O, Traeger C H & Batterman R C. Therapeutic criteria in rheumatoid arthritis. *J. Amer. Med. Assoc.* 140:659-62, 1949.
90. 203 13 9 6 Stetten M R. Some aspects of the metabolism of hydroxyproline studied with the aid of isotopic nitrogen. *J. Biol. Chem.* 181:31-37, 1949.
91. 229 15 23 13 Strom G. The influence of anoxia on lactate utilization in man after prolonged muscular work. *Acta. Physiol. Scand.* 17:440-51, 1949.
92. 296 19 22 18 Swift H F, Wilson A T & Lancefield R C. Typing group A hemolytic streptococci by M precipitin reactions in capillary pipettes. *J. Exp. Med.* 78:127-34, 1943.
93. 283 18 27 24 Taylor A C & Kollros J J. Stages in the normal development of *Rana pipiens* larvae. *Anatomical Record* 94:7-24, 1946.
94. 197 13 24 23 Thomas J E. An improved cannula for gastric and intestinal fistulas. *Proc. Soc. Exp. Biol. Med.* 46:260-61, 1941.
95. 228 15 18 15 Ussing H H. The distinction by means of tracers between active transport and diffusion; the transfer of iodide across the isolated frog skin. *Acta. Physiol. Scand.* 19:43-56, 1949.
96. 400 26 26 24 Verney E B. The antidiuretic hormone and factors which determine its release. *Proc. Roy. Soc. London B Biol.* 135:25-106, 1947.
97. 194 12 9 10 Waldenstrom J. Incipient myelomatosis or "essential" hyperglobulinemia with fibrinogenopenia; a new syndrome. *Acta Med. Scand.* 117:216-47, 1944.
98. 426 28 24 20 Weichselbaum T E. Studies on experimental hypertension. 12. The experimental production and pathogenesis of hypertension due to renal ischemia. *Amer. J. Clin. Pathol.* 10:40-72, 1946.
99. 245 16 12 20 Weichselbaum T E, Levine M G & Hoyt R E. The use of pectin and gelatin in the processing of plasma in the blood bank. *Amer. J. Clin. Pathol.* 16:40-44, 1946.
100. 275 18 26 19 Weiss P & Hiscoe H B. Experiments on the mechanism of nerve growth. *J. Exp. Zoology* 107:315-95, 1948.
101. 287 19 16 18 Westergaard M & Mitchell H K. *Neurospora*. 5. A synthetic medium favoring sexual reproduction. *Amer. J. Botany* 34:573-7, 1947.
102. 426 28 33 32 Wilcoxon F. Individual comparisons by ranking methods. *Biometrics* 1:80-3, 1945.
103. 166 11 11 12 Wright H P. The adhesiveness of blood platelets in normal subjects with varying concentrations of anticoagulants. *J. Pathol. Bacteriol.* 53:255-62, 1941.
104. 251 16 14 12 Zilversmit D B, Entenman C & Fishler M C. On the calculation of "turnover time" and "turnover rate" from experiments involving the use of labeling agents. *J. General Physiology* 26:325-32, 1943.