

367. Edwards, F. J.: *Future of Quartz & Silica*; Soc. of Glass Technology, *Jol.* 39:58-60, February 1955; cf. also pp. 37-47.

368. Gilfillan: *Inventing the Ship*, N 147, pp. 234-9.

369. From: *Fed. Funds for Sci.*, III, N 56, p. 33, we derive that the phys. science obligations embraced 95.6% of the Fed. payments for conducting Defense R&D and that the total Phys. sci. aside from Defense was \$288 m.; and from table 7 that non-Defense R&D was supplemented by \$102 m. for increase of R&D plant; so we get a non-Defense total of \$390 m. including building funds. Then we turn to the X ed. of *Fed. Funds*, p. 122, to obtain the Defense R&D obligations for 1954, including building and military pay and allowances, \$2,416 m., reduce this to 95.6% for Phys. sci. only, and add it to the non-Defense obligations above derived, giving \$2,700 m. We next reduce this by 5% to change from Obligations to Expenditures as in III: 21:1953, and add \$9 m. for OTS and pat. expenses, yielding \$2,575 m.

370. *Fed. Funds for Sci.*, X, p. 106 gives for 1962 anticipations, for Research only, \$603 m., for physical sciences proper, and \$1,348 m. for engg. scis: (part of \$31 m. for math. scis. might be appropriate to add), and a quarter million for the Patent Office. There were also \$151 m. for the biol., \$535 m. for medical, \$83 m. for agric., \$70 m. for soc., \$50 m. for psych. and \$41 m. for other scis., a total of \$2,912 m. for Research only. Assuming that the phys. and engg. proportion held also for the amended 1962 total of \$10,792 m. (p. 18) including Development, plant addition and military pay, less 5% to reduce budget to expenditures, we get \$6.8 billion for invention and its sciences. As an alternative estimate, we take from pp. 78,9 the gross R&D budget for the Government departments likely to work mainly for invention and its sciences; less 5% their amended R&D budget totals \$8.4 billion. The average of these two estimates, \$7.6 billion, is set down as our best guess.

371. Repartition according to the sources of support for higher education in general in 1951-52, from U.S. Office of Education: State of Higher Education, table G, reducing the item "fees etc." by one-half and placing it in the commercial column.

372. U.S. NSF: *Scientific Activities in 6 State Govts.*, summary rept. on a Survey, Fiscal Yr. 1954, 62 pp. Covers N.Y., Calif., Conn., N. Mex., N.C., and Wis., States which took 31% of the patents then granted to Americans. Tables on pp. 6 and 36-8; also *Stat. Abstract*.

373. U.S. NSF: *Scientific R&D in Colleges and Universities*, Expenditures and Manpower, 1953-4, 173 pp., esp. table 4, and p. 49. The work in 807 small colleges and universities proper was added to that of the 173 which did almost all.

374. Funds for R&D in Engg. Schools, 1953-4; No. 7 of NSF: *Rev. of Data on R&D*.

375. Of their patents only 67 were under the exclusive licensing arrangement likely to be of the commercial, monopolistic nature. For 1954, from Palmer, N 160, p. 42. Cf. our ¶ 127.

376. NSF: *Scientific R&D of Nonprofit Organizations*, Expenditures & Manpower, 1957, 58 pp. p. 37. We took 18% from Table 25.

377. Battelle Mem. Inst. for NSF: *Research by Cooperative Organizations*, a Survey of Sci. Research by Trade Asns., Professional and Tech. Socs., and Other Cooperative Groups, 1953, 47 pp. Table 7, reduced by 6.6% to eliminate soc. sci., per table 3, and then by 12% according to the proportion of inventive sci. to non-inventive nonagri. sci. indicated by the 2d table on p. 24. Performance figures, with their wider basis, were from table 6, only "In House" from own funds.

378. Green, Jn. C. & Judkins, J.: *Tech. Research Activities of Cooperative Asns.*, Study No. 21 of the present ser., 1959, 59 pp.

379. N 377, table 7, which gives \$11.5 m. from the Trade Asns. and \$1.6 m. from other cooperative groups (p. 5). These are reduced by 3.5% to eliminate soc. sci., per table 3. Performance as in N 377.

380. *Revs. of Data*, N 40, p. 6; taking 52%.

381. Using NSF: *Science and Engg. in Amer. Industry*, Rept. on a 1956 Survey, 117 pp., p. 32 and table A-33.

382. Inventions Pay, in *Bus. Week*, Jan. 19, 1952, pp. 123-8. Cf. also J. F. Creed, R. B. Bangs and J. P. Driscoll: *Fed. Taxation of the Inventor*; *PTOJRE* 2:505-19, 1958.

McFadden J. A. & C. D. Tuska: *Accounting and Tax Aspects of Pats. & Research*, 1960, rev. by Rossman in *JPOS* 42:572-8.