FREDERICK HAYNES NEWELL AND THE REVOLT OF THE ENGINEERS

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In December, 1914, Frederick Haynes Newell, the founder and first director of the Reclamation Service, was quietly dismissed from his position by Wilson's Secretary of the Interior, Franklin K. Lane.[1] Leaving must have been a bitter experience for Newell; he had served the federal government since 1888, just three years after receiving his engineering degree from M.I.T. Inspired by the head of the Geological Survey, the legendary Major John Wesley Powell, Newell had dreamed of applying his scientific training to the development of the arid West. Over the years Newell labored to gather information on the hydrography of the West, and at the same time he patiently and discreetly lobbied and spread propaganda for a scientific, comprehensive approach to the development of natural resources, that is, for what came to be known euphemistically--and confusingly--as "conservation." As a founder of the national conservation movement Newell ranks high, perhaps second only to the great forester, Gifford Pinchot. Triumph for Newell had come with the passage of the Newlands Reclamation Act of 1902. There followed busy years in which Newell organized the Reclamation Service, years during which he supervised the planning and building of dams and irrigation works to reclaim the arid lands of the West.

But troubles soon developed in what was one of the first American attempts to apply scientific, centralized national planning. Local interests sometimes opposed the decisions of Washington planners, and such groups were not slow to organize effective lobbying against Newell's policies. In addition, political and philosophical differences developed between Newell and his superiors during the Taft and Wilson administrations; from 1909 to 1914 Newell was at odds with successive Secretaries of the Interior.[2] Despite Newell's stubborn singleness of purpose, his conviction of his own righteousness, and his belief that the engineer knows best, indeed, perhaps because of these characteristics, Newell's power in the Reclamation Service was steadily whittled down until the final dismissal.

Newell's firing was not too surprising in the light of Pinchot's earlier and more spectacular separation from government service. But more significant were the differing responses of the forester and the engineer. Both were crusaders imbued with a messianic zeal. Pinchot reacted to his dismissal by throwing himself into the Bull Moose third-party movement,

and he continued to be a fixture of American reform politics through the New Deal period. Newell, too, embarked on a crusade, but one of a different character. Newell directed his attention to a narrower audience, to his own professional brethren, the engineers. He organized and led a revolt of engineers whose immediate object was the unification of the engineering profession in the image of the American Medical Association. But professional unification was only a first step through which Newell and his followers hoped to achieve a more ambitious end: the engineering of American society.

The application of engineering to society was a theme that resounded in the technical press in the first quarter of the twentieth century; by 1915 it had become a prominent part of the engineer's ideology. The past triumphs of science and technology inspired engineers with the hope that the same method that had enabled man to master nature would allow them to understand and control human affairs. In practice, science applied to society meant the conscious, rational control of some or all social processes in accordance with scientific principles--that is, what is usually termed "planning." The conservation movement represented a concrete example of such planning, though one confined to a limited area; similar examples were provided by scientific management and city planning. The early successes of these efforts encouraged engineers to believe that their methods might solve society's largest problems, that engineering applied to society might abolish class conflict, end the squabbling over trusts, and resolve other great national questions. Indeed, some engineers had caught the vision of a scientific Utopia to be built by the engineering profession. "The Golden Rule will be put in practice," asserted one engineer, "through the slide rule of the engineer."[3] The First World War caused the major belligerent states to adopt measures of centralized planning, and this trend inspired many engineers with a belief in the imminence of the planned society.

The application of the engineering method to human affairs implied treating man as a material, a fact clearly recognized by Newell. He wanted engineers to undertake "the beneficial control of human forces and sentiments."[4] Human groups, Newell argued, should be examined by engineers as if they were machines "in which the wheels and bearings are men and not metals."[5] However, the Orwellian implications of the ideas of Newell and other engineers were obscured by their habit of clothing their proposals in a moralistic rhetoric. Thus engineers avoided the term "planning," preferring such euphemisms as "conservation," "the elimination of waste," and "service to society." Newell portrayed the causes which he espoused as struggles between good and evil. Conservation he saw as a battle between the "aggressive minority" intent on personal gain and the reformer full of "altruistic ideals."[6] The role of the engineer, Newell thought, should be that of a "missionary of light and progress,"[7] or that of a "pioneer of a better and higher degree of civilization."[8] He discussed proposals for lobbying and propaganda by

engineers in terms of "social responsibility" and "cooperation." Though Newell's objectives in seeking to unify the engineers and to undertake social planning quite explicitly included the improvement and elevation of the status of engineers, he insisted that the engineers' true motives were altruistic.

One reason engineers advocated social planning was, however, self-interest. It appeared obvious that an engineered society would be ruled by engineers. Throughout the writings of engineers, there ran the virtually unanimous conviction that engineers lacked the status and power that they deserved. In practice the great majority of engineers were employees organized into governmental and corporate bureaucracies. But engineers thought of themselves as professional men and they compared their position unfavorably with that of doctors and lawyers. Newell defined the professional engineer as one who was "working independently, directing his own affairs with the maximum of personal freedom."[9] In contrast to the engineer, Newell argued, the doctor or lawyer "is called in not to carry out instructions of an employer, but on the contrary to dictate to the man who ultimately pays the fee.... He ceases to be a professional man the moment he takes orders from an employer."[10] Newell was thus leading a revolt of organization men who felt that control over technological processes was rightly theirs. As one engineer put it, the engineer was "a servant where he should be a master."[11] "The time has come," echoed another, "for the engineer to possess his own."[12]

The obvious first step for engineers was to create a united engineering profession to act as their national spokesman. But an obstacle lay in the path of unity; the four largest national societies, known collectively as the Founder Societies, dominated the engineering scene by reason of tradition, wealth, and prestige. Newell was convinced that they were unfit to serve as a basis for a united profession. The Founder Societies had become self-perpetuating oligarchies dominated by conservative cliques centered in New York, composed in large part of engineers who had gone into business or who had become corporation executives.[13] Newell's own national society, the American Society of Civil Engineers, or A.S.C.E., was one of the worst in this respect. Since 1900 the A.S.C.E. had been governed undemocratically; in that year an amendment to the society's constitution had been adopted which created a nominating committee wholly controlled by the board of directors. The committee's meetings were secret and only one candidate was nominated for each office.[14] Attempts had been made in 1909 and 1913 to democratize the constitution but without success. In any case, the A.S.C.E. could not truly represent all civil engineers because of its high entrance requirements; only those in responsible charge of works could become voting members. The great majority of civil engineers were employees who could not qualify, and most were not members of the A.S.C.E.

Newell's distrust of the Founder Societies was also conditioned by other factors. Far from encouraging their members in the wider application of

engineering to society, the Founder Societies appeared to Newell to discourage such activities.[15] Newell himself had received little or no aid from them in his intermittent struggles within the government service.

On February 8, 1915, Newell recorded in his diary, "New idea on engineering federation. Wrote to Charles Whiting Baker."[16] This new idea was to dominate Newell's thought for the next six years, and was destined to shake the engineering profession to its foundations. In essence, Newell envisaged by-passing the Founder Societies by creating a federation of local and regional engineering societies. In furthering this project, which he christened "engineering cooperation," Newell received vital support from Charles Whiting Baker, the editor of the influential magazine Engineering News. Baker not only opened the pages of his journal to articles by Newell and his followers, but he provided massive editorial support as well. Some of Newell's papers were printed anonymously; in this Newell and Baker were continuing a convenient arrangement begun while Newell was still in government service.[17] Newell, for his part, was busy lining up support from leading engineers. One of his most valuable converts was C. E. Drayer, who proved to be an ideal second-in-command.

The idea of engineering cooperation set forth in numerous articles and speeches by Newell and Drayer centered around a four-point program. Engineers should unite--or cooperate--in order to create an employment bureau, improve professional ethics, secure the passage of better laws, and carry out publicity. An employment bureau would appeal to younger engineers. Enhancing professional ethics would help rid engineering of commercialism. A unified profession would defend the engineer in public service.

But the crux of Newell's proposals was contained under the headings "publicity" and "better laws." Newell was convinced that a major reorganization of American society was impending. "Out of the white heat of the devouring conflict in Europe," he predicted, "a new world is emerging."[18] This new world would be planned; the question was, who would do the planning? Newell was convinced that the engineer was the best qualified, because only through the use of his method could lasting solutions to outstanding national problems be found. Newell stressed that the scope of engineering planning would not be confined to the purely material questions that engineers had traditionally been concerned with; "Primarily under our new conception of things," wrote Newell, "the engineer is concerned with the greatest of all the forces used in engineering, that of man himself."[19] Before a congress on "human engineering" Newell argued that there were laws in industry as certain as those in nature, and that by discovering and applying these laws engineers could pull "humanity from this slough of discord."[20] The engineering of society was to Newell an enlargement of the conservation idea. "In all of these matters which pertain to the conservation and use of the resources of

the country, both material and human, and to the development of ideals," Newell asserted, "the engineer should be the leader."[21]

To secure united action Newell called a conference at Buffalo, June 23, 1915, to be held concurrently with the annual meeting of the American Society of Mechanical Engineers. This meeting was not a success. Attendance was small, and the delegates recommended against forming a new organization "at this time."[22] Newell recovered quickly from this initial setback. He broadened the base of his movement by creating a committee on engineering cooperation, with himself as president and Drayer as secretary, to which a number of prominent engineers lent their names. After a more extensive publicity campaign, Newell called a second conference on April 13, 1916. This time the conference was attended by delegates representing forty engineering societies, and great enthusiasm was engendered. The conference empowered Newell to select a sub-committee to draw up a plan for the unification of the engineering profession.[23]

At the third conference which met on March 29 and 30, 1917, Newell presented the plan of unification drawn up by his sub-committee. It called for immediate unification of the engineering profession, with or without the Founder Societies. But Newell was doomed to disappointment. Shortly before the conference, the Founder Societies announced their intention of creating a body, the Engineering Council, to serve as a national spokesman for the engineering profession. At the conference, when the report of Newell's sub-committee was presented, a prominent member of the A.S.C.E., Gardner S. Williams, introduced an alternative resolution, which merely asked the four national societies to expand the base of their proposed council to include representatives of other engineering societies. After much debate Williams' resolution was carried, and Newell's cooperation movement appeared to be a total wreck.[24]

At this point Newell demonstrated his remarkable versatility and ingenuity. He abandoned the committee on cooperation, but found a new means to the same end in a protest organization of young engineers, the American Association of Engineers. The discontent of the younger engineers was of long standing, largely because of an oversupply of engineers. It was common for employers to exploit younger engineers as cheap labor, older engineers often being the worst offenders in this respect.[25] The resulting discontent of the younger men bore fruit in 1914 with the creation of the Associated Technical Men, at first principally composed of municipal employees in the Chicago area. This organization soon split into two factions, one favoring and one opposing the formation of a labor union. The anti-union engineers approached a number of prominent engineers, including Newell, to enlist their support in the founding of a new organization, the American Association of Engineers, or A.A.E. The motives of the older engineers, who controlled the A.A.E. from the start, were mixed; while sympathetic with the young men they also

feared their "radicalism," and one reason they joined the A.A.E. was to guide the new organization into safe channels, confining its activities to publicity and "boosterism," plus an employment bureau, and to avoid "labor union" tactics such as licensing or collective bargaining.

Initially Newell apparently had no thought of using the A.A.E. as a vehicle for unifying the engineering profession. Like other older engineers he wished to head off agitation for licensing as a means of cutting the supply of engineers. At the first meeting of the A.A.E. at Chicago in September, 1915, Newell assured the younger men that it would not be necessary to restrict the supply, since there would be a great increase in the demand for engineers once the public was made aware of their potential usefulness in solving social problems. At that time Newell argued that the A.A.E. and his cooperation movement had separate, though harmonious, objectives.[27] But after the failure of the third conference on cooperation, Newell and Drayer transferred their attention to the A.A.E. In 1918 Drayer became secretary of the association, and Newell was elected president the following year.

The results of Newell's and Drayer's leadership of the A.A.E. were spectacular. Between January, 1919, and September, 1920, the A.A.E. increased its membership from 2,300 to 20,000. One reason for this success was that the A.A.E. under Newell and Drayer became more militant in advancing the engineer's material welfare. Reversing its previous position, the A.A.E. adopted licensing as a fundamental tenet.[28] But the aims of professional unity were not forgotten. The A.A.E. was remodeled to approximate the federation which Newell had envisaged in 1915. At the end of Newell's year as president he assumed the newly created post of "director of field forces," a sort of traveling chief executive; this position had been sketched originally in 1915 by Newell as a part of his proposed unity organization.[29] More significant for Newell's revised conception of the A.A.E. was the idea of working out reciprocity agreements between the A.A.E. and local and regional engineering societies. By an exchange of membership the local societies would become, in effect, branches of the A.A.E.[30] Similarly Newell transferred to the A.A.E. his hopes for the engineering of society. He wanted each local chapter to become a center for the study of engineering applied to social problems. "The same genius which has enabled the engineer to control the floods and direct electric energy," Newell told the members of the A.A.E., "should enable him to study effectively and turn to the benefit of humanity the great forces wrongly employed or lying latent in human needs and desires."[31]

Paralleling their work in building up the A.A.E., Newell and his followers undertook to discredit the Engineering Council, the association's chief rival as spokesman for the engineering profession. Supported by Engineering News, they denounced the council as undemocratic and unrepresentative. Such charges were not without foundation; the Founder Societies had ignored the request of the third conference on cooperation that their council

include other engineering societies. Only when Newell began to work out reciprocity agreements with local and regional engineering societies did the Engineering Council open its membership to these societies. That the publicity efforts of Newell, Baker, and Drayer were not in vain is indicated by the fact that only two engineering societies took advantage of this opportunity to join the council.[32]

In the early part of 1920, just as he appeared to be on the verge of triumph, a revolt developed against Newell as leader of the engineering profession. Many progressive engineers were far from enthusiastic about Newell. Morris L. Cooke, the outstanding reformer among mechanical engineers, had been active in both the cooperation movement and the A.A.E. But he had always distrusted Newell and Baker, and he continued to work for reform of the American Society of Mechanical Engineers.[33] The same apparently was true of several prominent civil engineers in the reform camp, notably Gardner S. Williams. Such men were convinced that any successful unification of their profession must be based on the Founder Societies. The successes of Newell and the A.A.E. constituted a profound threat to the preeminence of the Founder Societies; this enabled the anti-Newell reformers to convince a majority of the Founder-Society membership of the necessity of replacing the Engineering Council by a truly representative unity organization. In 1920 the Founder Societies sent out invitations to all engineering societies to meet in Washington on June 3 and 4 to unify the engineering profession.

Newell fought this new threat to his leadership. At the organizing conference in Washington, Newell spoke eloquently in behalf of the A.A.E. He attempted to have the new organization based on individual rather than society memberships, which would have given the A.A.E. a dominant role, since it was then the largest engineering society in the nation. When this failed, he next tried to incorporate the A.A.E. in the new federation on special terms: it would represent the entire profession in matters of welfare. This bid for special autonomy within the new organization, the Federated American Engineering Societies, or F.A.E.S., was also defeated.[34] Newell, however, was not finished. He and many of his followers were still members of the A.S.C.E. and they allied themselves with conservatives to defeat the proposal that the A.S.C.E. join the F.A.E.S. This constituted a serious blow to the new federation, and contributed materially to its eventual failure.[35]

But Newell was unable to profit by the crippling of the F.A.E.S. In 1921 an insurgent faction seized control of the A.A.E.'s annual convention and abolished Newell's office, that of director of field forces. Only a last-minute rally of pro-Newell forces prevented the supercession of Drayer, who managed to maintain a precarious tenure as secretary until early 1925. But Newell and Drayer had lost control of the A.A.E. In any case, the association began to disintegrate. Apart from internal dissension, several other factors were influential. The return to "normalcy" in the nation at large

dashed engineers' hopes in the imminence of the planned society. The end of inflation and the postwar collapse of organized labor improved the economic position of younger engineers, with disastrous consequences for their protest organization, the A.A.E. By the middle of 1922, more than one-fourth of its members were over three months in arrears of dues, and within a few years its membership stabilized at a paltry 5,000. Newell ceased to play a leading role in engineering-society affairs. The revolt of the engineers had come to an end.[36]

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Footnotes:

[1] "Reorganization of the U. S. Reclamation Service," Engineering Record, LXX, current news section (December 12, 1914), 285.

[2] Samuel P. Hays, Conservation and the Gospel of Efficiency (Cambridge, Mass., 1959), 241-248, provides a convenient summary; for a defense of Newell see "Secretary Ballinger and the United States Reclamation Service," Engineering News, LXIII (January 13, 1910), 46-48.

[3] E.D. Meier, "The Engineer and the Future," Journal of the American Society of Mechanical Engineers, XXXIV, pt. 1 (January, 1912), 5.

[4] F. H. Newell, "The Engineer as a Citizen," Journal of the American Society of Mechanical Engineers, XXXVII (July, 1915), p. vi.

[5] F. H. Newell, "The Engineer in Public Service," 13 (Ms. of address, May, 1912), notebook "Newell 1912," container 6, Papers of Frederick Haynes Newell, Manuscripts Division, Library of Congress.

[6] F. H. Newell, Water Resources, Present and Future Uses (New Haven, 1920), 30.

[7] F. H. Newell, "Awakening of the Engineer," Engineering News, LXXIV (September 16, 1915), 568.

[8] Newell, "The Engineer in Public Service," 6, Newell Papers.

[9] F. H. Newell, "A Practical Plan of Engineering Cooperation," Journal of the Cleveland Engineering Society, IX (March, 1917), 311.

[10] Ibid.

[11] Onward Bates, "Address at the Forty-First Annual Convention," Transactions of the American Society of Civil Engineers, LXIV (September, 1909), 573. (Periodical hereafter referred to as Trans ASCE.)

[12] Hunter McDonald, "Address at the Annual Convention," Trans ASCE, LXXVII (December, 1914), 1755. Both McDonald and Bates (note 11) were later associated with Newell's attempts to unite the engineering profession.

[13] F. H. Newell, "Ethics of the Engineering Profession," The Annals of the American Academy of Political and Social Science, CI (May, 1922), 77-78, 81-85.

[14] "Letters Relating to Report of the Committee on Development," Proceedings of the American Society of Civil Engineers, XLV, society affairs (Oct., Nov., Dec., 1919), 920. (Periodical hereafter referred to as Proc ASCE.)

[15] F. H. Newell, "The Engineer in the Public Service," Engineering News, LXVIII (July 25, 1912), 153.

[16] Diary of Frederick Haynes Newell, February 8, 1915, container 2, Newell Papers.

[17] Newell included his anonymously written articles in his biobibliography, possibly being unaware of the fact that the University of Illinois, where he was employed, published complete lists of faculty publications. See note 19. For an example of the use of anonymity while Newell was still in public service, see Newell to Charles Whiting Baker, March 10, 1913, notebook "Newell 1912," container 6, Newell Papers.

[18] Newell, "A Practical Plan of Engineering Cooperation," 308.

[19] Engineer [Frederick Haynes Newell], "Engineering Profession Should Have Leading Part in Reconstruction," Engineering News-Record, LXXXI (October 17, 1918), 729. For Newell's authorship, see University of Illinois, Books and Articles Published by the Corps of Instruction, May 1, 1918-April 30, 1919 (n.p., n.d.), 26.

[20] F. H. Newell, "The New Emphasis on the Human Factor in Industry," Ohio State University Bulletin, XXI (January, 1917), 103-105.

[21] Engineer [Newell], "Engineering Profession Should Have Leading Part in Reconstruction," 730.

[22] Compare expectations with results in "Engineers Will Discuss Plans for Nation-Wide Cooperation Movement," Engineering Record, LXXI (June 19, 1915), 766-767 and "Co-operation of Engineers in Publicity Work," Engineering News, LXXIV (July 1, 1915), 41. The reason for the failure was that Newell made a tactical error by trying to capitalize on the reform agitation among mechanical engineers. The mechanical engineers were suspicious of outsiders; a few years later Thorstein Veblen was also to try and fail to harness the discontent of the mechanical engineers. See the author's "Veblen and the Engineers," American Quarterly, XIV (Spring, 1962), 64-72.

[23] Newell Diary, April 13, 1916, Newell Papers. See also "Conference on Engineering Co-operation at Chicago," Engineering News, LXXV (April 20, 1916), 771-772.

[24] There is an imperfect but nonetheless useful stenographic transcript of this conference in container 5, Newell Papers. See also, Gardner S. Williams, "Engineering Cooperation Outside the National Societies," Bulletin of the Federated American Engineering Societies, II (April, 1923), 6.

[25] "Final Report of the Special Committee to Investigate the Conditions of Employment of, and Compensation of, Civil Engineers," Trans ASCE, LXXXI (December, 1917), 1212.

[26] Isham Randolph, "Glad Question Three was Defeated," Engineering News-Record, LXXXIV (May 13, 1920), 978.

[27] Newell, "Awakening of the Engineer," 569.

[28] "Change in License Policy, "Monad, IV (November, 1919), 19. "Growth of A.A.E. to 20,000," Professional Engineer, V (September, 1920), 22.

[29] "Engineers Will Discuss Plans for Nation-Wide Cooperation Movement," 767.

[30] How these reciprocity agreements worked is described in G. M. Butler, "What A.A.E. May Do for Local Societies," Professional Engineer, V (August, 1920), 10-11.

[31] F. H. Newell, "Address of Frederick H. Newell as Retiring President of the American Association of Engineers," Professional Engineer, V (June, 1920), 10.

[32] For examples of attacks on the council see C. E. Drayer, "Will Engineering Council Satisfy the Demand?" Engineering News, LXXVIII (May 3, 1917), 277-278, and the supporting editorial, "The Engineering Council is Challenged," Engineering News, LXXVIII (May 10, 1917), 321. J. Parke Channing and others, Engineering Council, A Brief History (New York, 1921), 3-4. This pamphlet is in the American Engineering Council Papers, Engineering Societies Library, New York.

[33] Personal interviews with Morris L. Cooke, June 27 and 28, 1957. Cooke's suspicions were not without foundation. At a later date Newell solicited and got support from the utilities lobby in order to combat sentiment for public ownership. But Newell's firm of consulting engineers was engaged in studies of utilities for public bodies in Pennsylvania, Puerto Rico, and elsewhere. See memo to H. T. Sands, December 14, 1927 and "Agreement for Service Relations between National Electric Light Association and the Research Service, Inc.," volume 78, container 13, Newell Papers.

[34] Proceedings Organizing Conference, Federated American Engineering Societies, Washington, June 3-4, 1920, 38-40, 90-91, stenographic transcript in American Engineering Council Papers.

35 F. H. Newell, "Shall the Am. Soc. of C. E. Enter the Field of Civic and Economic Affairs?" Engineering News-Record, LXXXIV (March 11, 1920), 536 and Randolph, "Glad Question Three was Defeated," 978. "Federation Decisively Defeated," Engineering News-Record, LXXXV (November 11, 1920), 917.

[36] "A.A.E. Rejects Plan for Salaried President," Engineering News-Record, LXXXVI (May 19, 1921), 870-871. "American Association of Engineers Convention Passes Stabilizing Measures," Engineering News-Record, LXXXVIII (June 15, 1922), 1011-1012. For Drayer's own version of what happened see Drayer to Morris L. Cooke, November 12, 1927, box 49, file 462, Papers of Morris L. Cooke, Franklin D. Roosevelt Library, Hyde Park, New York.