

EXHIBIT 3

American Dictionary

OF THE

ENGLISH LANGUAGE

By NOAH WEBSTER, LL. D.

Thoroughly Revised, and greatly Enlarged and Improved

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VOLUME I.



CAMBRIDGE

Printed at the Riverside Press

FOR G. & C. MERRIAM, PUBLISHERS, SPRINGFIELD, MASS.

1865

EXHIBIT 4

DICTIONARY

OF THE

ENGLISH LANGUAGE.

BY

JOSEPH E. WORCESTER, LL. D.

MULTA RENASCENTUR QUÆ JAM CECIDÈRE, CADENTQUE
QUÆ NUNC SUNT IN HONORE VOCABULA, SI VOLET USUS;
QUEM PENES ARBITRIUM EST, ET JUS, ET NORMA LOQUENDI.

HORACE.

BOSTON:

BREWER AND TILESTON.

CLEVELAND: INGHAM AND BRAGG.

1863.

2. To stop up; to close. "Constipating or shutting up the capillary vessels." *Arbuthnot*.
3. To make costive.

Hard and vehement friction doth constipate the body. *Holland*.

CŌN-STĪ-PĀ'TĪŌN, *n.* [*L. constipatio*; *It. costipazione*; *Sp. constipacion*; *Fr. constipation*.]

1. The act of constipating; a crowding together; condensation. "A pretty close constipation of its particles." *Bentley*.
2. Costiveness. *Arbuthnot*.

CŌN-STĪT'U-ĒN-CY (kŏn-stī'yū-ēn-sē), *n.* A body of constituents. *Lord J. Russell*.

CŌN-STĪT'U-ĒNT (kŏn-stī'yū-ēnt), *a.* [*L. constituo, constituens*, to put together; *It. costituente*; *Sp. constituyente*; *Fr. constituant*.] Forming; composing; constituting; as, "The constituent parts of a compound."

CŌN-STĪT'U-ĒNT (kŏn-stī'yū-ēnt), *n.* 1. He who or that which constitutes, composes, or forms. Their first composure requires a higher and nobler constituent than chance. *Hale*.
2. An elemental part; element; principle. The lymph in those glands is a necessary constituent of the aliment. *Arbuthnot*.
3. One who deposes another to act for him, especially in political matters; an elector. You may communicate this letter in any manner you think proper to my constituents. *Burke*.

CŌN-STĪ-TŪTE, *v. a.* [*L. constituo, constituere*; *con*, with, and *statuo*, to set up; *It. costituire*; *Sp. constituir*; *Fr. constituer*.] [*i. CONSTITUTED*; *pp. CONSTITUTING, CONSTITUTED*.]
1. To build up; to establish; to institute. This Brutus had three sons, who constituted three kingdoms. *Stow*.
2. To form or compose as an element. Men who their duties know, But know their rights, and knowing, dare maintain, Prevent the long-sim'd blow, And crush the tyrant while they rend the chain, — These constitute a state. *Sir W. Jones*.
3. To appoint, depute, or empower; as, "To constitute one an attorney."

Syn. — Constitute a government; frame a constitution; form a plan or system of education; found colleges; establish schools; appoint judges. Constitute a leader; appoint a minister; depute a member to present a petition. — See APPOINT.

+ CŌN-STĪ-TŪTE, *n.* An established law. A man that will not obey the king's constitute. *Preston*, (1561.)

CŌN-STĪ-TŪT-ĒR, *n.* One who constitutes or appoints. *Sir T. Elyot*.

CŌN-STĪ-TŪT-ĪNG, *p. a.* Giving existence; establishing.

CŌN-STĪ-TŪTĪŌN, *n.* [*L. constitutio*; *It. costituzione*; *Sp. constitucion*; *Fr. constitution*.]
1. The act of constituting; formation.
2. State of being; peculiar structure; state of all the organs of the body; natural qualities, particularly of the body or of the mind. This light, being restored to its pristine constitution, became of the same condition as at first. *Newton*.
Beauty is nothing else but a just accord and harmony of the members, animated by a healthful constitution. *Dryden*.
He defended himself with undaunted courage, and less passion than was expected from his constitution. *Clarendon*.
3. The body of fundamental laws, as contained in written documents or established by prescriptive usage, which constitute the form of government for a nation, state, community, association, or society; as, "The constitution of the United States"; "The British constitution."
4. (*Ecol.*) A regulation or canon respecting the doctrine or discipline of the church. The number of constitutions [of the Church of England] is one hundred and forty-one. *Polit. Dict.*
5. (*Roman Law*.) Decrees of regular authorities, particularly of the emperors. *Brande*.

CŌN-STĪ-TŪTĪŌN-ĀL, *a.* [*Sp. constitucional*; *Fr. constitutionnel*.]
1. Inherent, or bred, in the constitution of the body or of the mind; natural. It is not probable any constitutional illness will be communicated with the small-pox by inoculation. *Sharp*.
2. Consistent with the fundamental laws, or with the civil constitution; legal. The Long Parliament of Charles I., while it acted in a constitutional manner, redressed many heavy grievances. *Blackstone*.
3. Pertaining to a civil constitution. "Constitutional freedom." *Polit. Dict.*

CŌN-STĪ-TŪTĪŌN-ĀL, *n.* Exercise for health, as walking, boating, playing at football, cricket, &c. [*Cambridge Univ., England*.] *Bristed*.

CŌN-STĪ-TŪTĪŌN-ĀL-ĪSM, *n.* Constitutional principles or government. [*R.*] *N. Brit. Rev.*

CŌN-STĪ-TŪTĪŌN-ĀL-ĪST, *n.* A framer or favorer of a constitution; an adherent to a constitution. *Burke*.

CŌN-STĪ-TŪTĪŌN-ĀL-Ī-TY, *n.* The state, or the quality, of being constitutional, or in accordance with the constitution; as, "The constitutionality of a law." *Ed. Rev.*

This word, which is regularly formed from constitution, or constitutional, is much used in the U. S., but comparatively little used in England.

CŌN-STĪ-TŪTĪŌN-ĀL-LY, *ad.* Agreeably to the constitution. *Ld. Chesterfield*.

CŌN-STĪ-TŪTĪŌN-Ā-RY, *a.* Consistent with the constitution; constitutional. [*R.*] *Marshall*.

CŌN-STĪ-TŪTĪŌN-ĒD (shŭnd), *p. a.* Having a constitution. "These tender-constituted ladies." *Spectator*.

CŌN-STĪ-TŪTĪŌN-ĪST, *n.* An adherent to the constitution; a constitutionalist. *Bolingbroke*.

|| CŌN-STĪ-TŪ-TĪVE, *a.* [*It. & Sp. constitutivo*; *Fr. constitutif*.]
1. That constitutes or forms; elemental; elementary; essential; constituent. The constitutive parts of a schematic being the esteem of himself and the contempt of others. *Decay of Piety*.
2. Having the power to enact or establish; instituting; creating. *Johnson*.

|| CŌN-STĪ-TŪ-TĪVE-LY, *ad.* In a constitutive manner. *Harrington*.
CŌN-STĪN'Ā-LE, *v. a.* [*L. constringo*; *con*, with, and *stringo*, to bind; *It. costringere, costringere*; *Sp. constreñir*; *Fr. contraindre*.] [*i. CONSTRAINED*; *pp. CONSTRAINING, CONSTRAINED*.]
1. To urge by force; to compel; to force; to enforce; to coerce; to oblige. And the Lord said to the servant, Go out into the ways and hedges, and constrain men to enter. *Luke xiv. 23. Wickliffe's Trans.*
2. To confine; to restrain; to repress; to hold. My sire in caves constrains the winds. *Dryden*.
He binds in chains The drowsy prophet, and his limbs constrains. *Dryden*.
3. To violate; to ravish. *Shak.*

Syn. — See COERCE.

CŌN-STĪN'Ā-BLE, *a.* That may be constrained. "They are now . . . constrainable." *Hooker*.

CŌN-STĪN'ĒD-LY, *ad.* By constraint. *Hooker*.

CŌN-STĪN'ĒR, *n.* One who constrains. *Johnson*.

CŌN-STĪN'ĪNG, *p. a.* Hindering by force; compelling; restraining.

CŌN-STĪN'T, *n.* [*Fr. contrainte*.]
1. Compulsion; force; necessity; obligation. Bitter constraint, and sad occasion dear, Compel me to disturb your season due. *Milton*.
2. Confinement; restraint; imprisonment. His limbs were waxen weak and raw Through long imprisonment and hard constraint. *Spenser*.
Syn. — See COMPULSION.

CŌN-STĪN'TĪVE, *a.* Having power to compel. "Any . . . constraintive vow." [*R.*] *Carew*.

CŌN-STĪCT', *v. a.* [*L. constringo, constrictus*.] [*i. CONSTRICTED*; *pp. CONSTRICTING, CONSTRICTED*.] To bind; to clamp; to contract. "Such things as constrict the fibres." *Arbuthnot*.

CŌN-STĪCT'ĒD, *p. a.* (*Bot.*) Contracted or tightened so as to be smaller in some parts than in others, as shown in the cut. *Loudon*.

CŌN-STĪCTĪŌN, *n.* [*L. constrictio*; *Sp. constrictcion*; *Fr. constrictcion*.] The act of constricting; contraction; compression. The constrictcion or dilatation of it [the air] may assist them to ascend or descend in the water. *Ray*.

CŌN-STĪCTĪVE, *a.* [*L. constrictivus*; *Sp. constrictivo*; *Fr. constrictif*.] Tending to contract or compress. *Sir T. Elyot*.

CŌN-STĪCT'ŌR, *n.* 1. (*Anat.*) That which constricts; — a term applied to any muscle that

closes an orifice. "Constrictor of the oesophagus." *Dunghison*.

2. (*Zool.*) A name applied to the larger serpents, which crush their prey in their folds, as the boa-constrictor. *Brande*.

CŌN-STĪNGE', *v. a.* [*L. constringo*; *It. constringere*.] To cause to contract; to constrict [*R.*] Strong liquors constringe, harden the fibres, and coagulate the fluids. *Arbuthnot*.

CŌN-STĪN'GENT, *a.* [*It. costringente*; *Sp. constringente*; *Fr. constringent*.] Causing to contract; binding or compressing. *Bacon*.

CŌN-STĪCT', *v. a.* [*L. construo, constructus*; *con*, with, and *struo*, to pile up; *It. costruire*; *Sp. construir*; *Fr. construire*.] [*i. CONSTRUCTED*; *pp. CONSTRUCTING, CONSTRUCTED*.]
1. To put together, as the parts of a thing, for a new product; to form with contrivance; to fabricate; to build; as, "To construct a machine"; "To construct a ship."
2. To devise and arrange. "He constructed a new system." *Johnson*.
To construct an expression or an equation. (*Geom.*) To find a geometrical figure whose parts shall be respectively represented by the quantities in the equation. *Davies & Peck*.

Syn. — See BUILD, FOUND.

CŌN-STĪCT'ĒR, *n.* One who constructs. "A constructor of dials." *Johnson*.

CŌN-STĪCTĪŌN, *n.* [*L. constructio*; *It. costruzione*; *Sp. construccion*; *Fr. construction*.]
1. The act of constructing; fabrication.
2. Mode of constructing or building; structure; conformation. The construction was a little various, according to the nature of the soil or the materials which they found. *Arbuthnot*.
3. (*Gram.*) The orderly disposition of words in a sentence, according to the rules of syntax. Some particles in certain constructions have the sense of a whole sentence contained in them. *Locke*.
4. The art of interpreting; explanation. He shall find the letter; observe his construction of it. *Shak.*
5. The sense or meaning; interpretation. He that would live at ease should always put the best construction on business and conversation. *Collier*.
Construction of equations. (*Geom.*) the interpretation of algebraic equations by geometric forms.

CŌN-STĪCTĪŌN-ĀL, *a.* To be understood by means of construction or interpretation. "Grants and constructional conveyances." *Waterland*.

CŌN-STĪCTĪŌN-ĪST, *n.* One who construes any instrument; as, "A strict constructionist."

CŌN-STĪCTĪVE, *a.* [*Sp. constructivo*.] Created or formed by construction; that may be interpreted; not expressed, but inferred. "Constructive treason." *Burnet*.
Standing mute now, in all cases, amounts to a constructive confession. *Blackstone*.
Constructive trust. (*Law*.) a trust raised by construction of law, or arising by operation of law, as distinguished from an express trust; a trust implied or inferred from circumstances. *Burrill*.

CŌN-STĪCTĪVE-LY, *ad.* By construction. *Hale*.

CŌN-STĪCTĪVE-NĒSS, *n.* (*Phren.*) The faculty of constructing. *Combe*.

CŌN-STĪCT'ŌR, *n.* One who constructs; a builder; a constructor. *Rambler*.

CŌN-STĪCT'ŪRE (kŏn-strŭkt'yŭr), *n.* Anything constructed; a structure. [*R.*] They shall the earth's structure closely biad. *Blackmore*.

CŌN-STĪCT'ŪRE, *p. J. F. Ja. Wb.*; *kŏn'strŭ*, *K. Sm.*; *kŏn'strŭ*, *S. E.*; *kŏn'strŭ* or *kŏn'strŭ*, *W.*, *v. a.* [*L. construo*; *It. costruire*; *Sp. construir*; *Fr. construire*.] [*i. CONSTRUCTED*; *pp. CONSTRUCTING, CONSTRUCTED*.] To discover or express the meaning of, by a right arrangement, or by a translation of the words of a sentence; to interpret; to explain; to translate; to render. Virgil is so very figurative that he requires, I may almost say, a grammar apart to construe him. *Dryden*.
"It is a scandal to seminaries of learning, that the latter pronunciation [kŏn'strŭ] should prevail there." *Walker*.

CŌN-STŪ-PRĀTE, *v. a.* [*L. constupro, constupratus*; *con*, with, and *stupro*, to ravish. [*i. CONSTUPRATED*; *pp. CONSTUPRATING, CONSTUPRATED*.] To violate; to debauch. *Bale*.

HIGH-METTLED

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HIMSELF

- sub-deacon; — distinguished from *low mass*, in which the prayers are simply rehearsed without singing. *Wright.*
- HIGH'-MÉT-TLED (hí'mét-tld), *a.* Proud or ardent of spirit. *Garth.*
- HIGH'-MÉN, *n.* False dice so loaded as always to turn up high numbers. *Harrington.*
- HIGH'-MÍND-ED, *a.* 1. Proud; arrogant; haughty. "Be not high-minded, but fear." *Rom. xi. 20.* 2. Elevated; noble; honorable. *Dr. Arnold.* *Now used most commonly in a good sense.*
- HIGH'-MÍND-ED-NÉSS, *n.* The quality of being high-minded. *C. W. Johnson.*
- HIGH'-MÓST (hí'móst), *a.* Highest; topmost. *Shak.*
- HIGH'-NÉSS (hí'nés), *n.* 1. The state of being high; elevation; loftiness. *Job xxxi. 28.* 2. Excellence; value; worth. *Howell.* 3. The style or title first applied to bishops, afterwards to European kings in general (succeeded by Majesty in the sixteenth century), afterwards to sovereign princes and their descendants. *Brande.*
- HIGH'-ÓP-ÉR-Á-TÍON, *n.* (*Surg.*) A method of extracting the stone from the human bladder by cutting into the upper part of it. *Dunghison.*
- HIGH'-PLÁCE, *n.* In Scripture, an eminence on which sacrifices were offered. *Wright.*
- HIGH'-PLÁCED, *a.* Elevated in situation or rank.
- HIGH'-PRÉSS-URE (hí'présh-yr), *n.* (*Steam-Engines.*) A pressure exceeding that of the atmosphere, which is equal to about 15 pounds on the square inch. *Brande.* *High-pressure engines, steam-engines in which the steam is not condensed on leaving the cylinder, but is allowed to escape into the atmosphere.* *Bigelow.*
- HIGH'-PRÍCED, *a.* Costly; dear. *Roget.*
- HIGH'-PRIÉST, *n.* The chief priest among the Israelites or Jews. *Newton.*
- HIGH'-PRIÉST-SHÍP, *n.* The office or state of a high-priest. *More.*
- HIGH'-PRÍN-CÍ-PLED (hí'prín'se-pld), *a.* 1. Extravagant in notions of politics. *Swift.* 2. Of elevated or honorable principles.
- HIGH'-PRÓOF, *a.* Very strong; rectified to a high degree, as brandy.
- HIGH'-PRÓOF, *ad.* To the utmost degree. *Shak.*
- HIGH'-RAÍSED (hí'rázd), *a.* Raised aloft; elevated. "On high-raised decks." *Dryden.*
- HIGH'-REÁCH-ÍNG, *a.* 1. Reaching upwards. *Hell bounds, high-reaching, to the horrid roof. Milton.* 2. Ambitious; aspiring. "High-reaching Buckingham." *Shak.*
- HIGH'-REÁRED (hí'réd), *a.* Of lofty structure. "High-reared bulwarks." *Shak.*
- HIGH'-RÉD (hí'réd), *a.* Deeply red. *Boyle.*
- HIGH'-RE-PENT-ED, *a.* Repented of to the utmost. "My high-repenting blames." *Shak.*
- HIGH'-RE-SÓLVED (hí're-zólvd'), *a.* Resolute; firm. "High-resolved men." *Shak.*
- HIGH'-RÍGGED (hí'rigd), *a.* Furnished with high rigging. *Ash.*
- HIGH'-RÓAD, *n.* A public road. *Smollett.*
- HIGH'-RÓOFED, *a.* Having a high roof. *Milton.*
- HIGH'-RÓPES, *n. pl.* A state of passion; — used only in the phrase, *To be on the high-ropes.* [Vulgar.] *Grose.*
- HIGH'-SCHÓOL, *n.* See *SCHOOL.*
- HIGH'-SÉA, *n.* Very strong, high waves; a heavy sea. *Crabb.*
- HIGH'-SÉA-SÓNED (hí'se-znd), *a.* Piquant to the palate; flavored with spices or other seasoning. "High-seasoned meats." *Locke.*
- HIGH'-SÉAT-ED, *a.* Fixed above. *Milton.*
- HIGH'-SHÓUL-DÉRED (-dér), *a.* Having high shoulders. *Goldsmith.*
- HIGH'-SÍGH-T-ED (hí'sit-ed), *a.* Always looking upwards. "High-sighted tyranny." *Shak.*
- HIGH'-SÓAR-ÍNG, *a.* Soaring to a great height. "Far high-soaring o'er thy praises." *Shak.*
- HIGH'-SÓUND-ÍNG, *a.* Making a loud noise or sound. *Congreve.*
- HIGH'-SPÍR-IT-ED, *a.* High-mettled; bold; daring; proud; insolent. *Hume.*
- HIGH'-STÓM-ÁCHED (-hí'stóm-ákt), *a.* Obstinate; self-willed; opinionated; lofty. *Shak.*
- HIGH'-STRÓNG, *a.* Strung to a full tone or a high pitch; high-spirited; proud. *Thomson.*
- HIGH'-SWÉLLED (-swéld), *a.* Swelled to the utmost; high-swollen. *Wright.*
- HIGH'-SWÉLL-ÍNG, *a.* Swelling to a great height. "High-swelling waves." *P. Fletcher.*
- HIGH'-SWÓLN, *a.* Swollen to the utmost. "Your high-swollen hearts." *Shak.*
- HÍGH-T (hit), *v. & p. defective.* ("Used in a very peculiar way for some of the passive tenses, without the addition of *am* or *was*." *Nares.*) [M. Goth. *haitan*; A. S. *hatan*, to name; Ger. *heissen*; Dan. *hædde*; Icel. *heita*.] 1. Am named; am called: — is named, or called. "Now high-t I Philostrate." *Chaucer.* Bright is her hue, and Geraldine she high-t. *Lord Surrey.* 2. Was named; was called. Within this homestead, lived without a peer, For crowing loud, the noble Chanticleer; So high-t her cock. *Dryden.* 3. To be named or called. But there as I was wont to high-t Arcite Now high-t I Philostrate. *Chaucer.* 4. Named; called. Amongst the rest a good old woman was, High-t Mother Hubbard. *Spenser.*
- HÍGH-T (hit), *v. a.* [A. S. *hatan*.] 1. To promise. *Chaucer.* 2. To intrust; to commit. "Charge of them was to a porter high-t." *Spenser.* 3. To command; to direct. *Spenser.* On high-t, *ad.*, aloud. *Spenser.*
- HIGH'-TÁ-PÉR, *n.* (*Bot.*) A name of the plant *Verbascum thapsus*, or shepherd's club. *Wright.*
- HIGH'-TÁST-ED, *a.* Gustful; piquant. *Denham.*
- HÍGH-TH (hih), *n.* See *HEIGHT.* *Milton.*
- HIGH'-TÓNED (-ténd), *a.* 1. Having a high tone or strong sound; as, "A high-toned instrument." 2. Decided; stanch; firm. *Johnson.*
- HIGH'-TÓP, *n.* 1. The summit of a ship. *Shak.* 2. A species of sweet apple. [Local.]
- HIGH'-TÓW-ÉRED (hí'tóu-ér), *a.* Having lofty towers. "Huge cities and high-towered." *Milton.*
- HIGH'-TÓW-ÉR-ÍNG, *a.* Soaring aloft. *Milton.*
- HIGH'-TRÉA-SÓN (hí'tré-zn), *n.* (*Law.*) Treason against the sovereign, as distinguished from petty treason, which might formerly be committed against a subject. *Burrill.*
- HÍGH'-VÍCED (hí'vís), *a.* Enormously wicked. "O'er some high-vice city." *Shak.*
- HIGH'-VÓICED (-vóiset), *a.* Having a strong tone or pitch of voice. *Jodrell.*
- HIGH'-WÁ-TÉR, *n.* The utmost flow of the tide; high-tide. *Mortimer.*
- HIGH'-WÁ-TÉR-MÁRK, *n.* The line or mark made on the shore by the tide, when it is at its greatest height. *Crabb.*
- HIGH'-WÁY (hí-wá'), *n.* 1. A great road; a public road; a road over which the public at large have a right of passage. *Brande.* 2. An open way by water. A public navigable river is also called a *highway*. *Brande.*
- HIGH'-WÁY-MAN (hí-wá-mán) [hí-wá-mán, S. W. P. J. E. F. Ja. Sm. Wr.; hí-wá'mán, K. Wb.], *n.* One who robs on the highway; a highway-robber; a robber; a footpad. *Swift.*
- HIGH'-WÁY-RÁTE, *n.* A road-rate for keeping the public roads in good order. *Simmonds.*
- HIGH'-WÁY-RÓB-BÉR, *n.* One who robs on the highway; highwayman. *Ash.*
- HIGH'-WÁY-RÓB-BÉR-Y, *n.* Robbery committed on the highway. *Ash.*
- HIGH'-WÍT-TÉD, *a.* Possessed of great wit. *Shak.*
- HIGH'-WROUGHT (hí'rawt), *a.* 1. Agitated to the utmost. "A high-wrought flood." *Shak.* 2. Accurately finished; nobly labored. *Pope.*
- HÍG-LÁ-PÉR, *n.* An herb. *Ainsworth.*
- HÍL'A-RÁTE, *v. a.* [Gr. *hilaris*; L. *hilaro*, *hilaratus*.] To exhilarate. *Cockeram.*
- HÍ-LÁ-RÍ-OUS, *a.* [Gr. *hilaris*; L. *hilaris*.] Full of hilarity; gay; merry; joyful; jovial. *Dickens.*
- HÍ-LÁ-RÍ-TY, *n.* [L. *hilaritas*; It. *ilarità*; Fr. *hilarité*.] Gayety excited by social pleasure; jollity; mirth; cheerfulness; jovialty; joyousness; good-humor; merriment; glee. Every morning waked us to a repetition of toll, but the evening repaid it with vacant hilarity. *Goldsmith.*
- HÍL'A-RY, *a.* (*Eng. Law.*) Noting a term of holding courts in England, beginning January 11, and ending January 31, about the time of the festival of St. Hilary. *Cowell.*
- HÍLD, *n.* [A. S. *hale*, a hero; Ger. *held*.] A lord or lady; so *Hildebert* is a noble lord, *Mathild* an heroic lady. *Gibson.*
- HÍLD-ÍNG, *n.* [A. S. *hyldan*, to bend, to crouch.] 1. A palsy, cowardly man; a dastard. *Shak.* 2. A base woman. *Rowe.*
- HÍLE, *n.* (*Bot.*) See *HILUM.* *Henslow.*
- HÍLL, *n.* [A. S. *hill*; Dut. *heuvel*; Ger. *hügel*; Dan. *høj*; Sw. *hög*; Icel. *höll*.] 1. An elevation of ground less than a mountain. "Mountains and all hills." *Ps. cxlviii. 9.* Hills peer o'er hills, and Alps on Alps arise. *Pope.* 2. The separate spot of soil in which seeds are planted, or in which the plants springing from them grow; — so called from usually having the earth raised about it. [U. S.] It is best to drop from four to seven grains [of maize] to each hill. *Farm. Ency.*
- HÍLL, *v. a.* [*i.* HILLED; *pp.* HILLING, HILLED.] 1. + [A. S. *hylan*, to conceal.] To cover. *Gower.* 2. To form into hills or small elevations, as the earth around plants. If the land be sufficiently loose, and deeply stirred, there is little use in hilling it. *Farm. Ency.*
- HÍLL'-ÁL-TAR, *n.* An altar on a hill or high place. *Peckler.*
- HILLED (hí'léd or híld), *a.* Having hills. *Hurd.*
- HÍL-LÍ-NÉSS, *n.* The state of being hilly. *Perry.*
- HÍL-LÍNG, *n.* 1. + A covering. *Todd.* 2. An accumulation; a heaping. "The hilling up of fatal gold." *Hewitt.* 3. The act of forming elevations of earth around plants. "In wet lands hilling may be ad' sable." *Farm. Ency.*
- HÍL-LOCK, *n.* A little hill. *Milton.*
- HÍL-LOCK, *v. a.* To form into a hillock or slight elevation. [R.] *Cowper.*
- HÍL-LOCK-Y, *a.* Abounding with hillocks. *Ash.*
- HÍLL'-SIDE, *n.* The side or slope of a hill. *Milton.*
- HÍLL'-SLOPE, *n.* The slope or declivity of a hill; hill-side. *Phillips.*
- HÍLL'-TÓP, *n.* The top of a hill. *Milton.*
- HÍL-LY, *a.* 1. Full of hills; uneven or unequal in surface. "Hilly countries." *Addison.* 2. Like a hill; elevated; lofty. "The top of hilly empire." *Beau. & Fl.*
- HÍL-SÁH, *n.* A native fish of the Ganges, much esteemed for food. *Simmonds.*
- HÍLT, *n.* [A. S. *hilt*; *haldan*, to hold.] A handle, particularly of a sword. *Shak.*
- HÍLT-ED, *a.* Having a hilt; — used in composition. "A silver-hilted sword." *Todd.*
- HÍL-TER-SKÍL-TER, *ad.* See *HELT-ER-SKELTER.*
- HÍL-UM, *n.* (*Bot.*) The scar left on a seed where it separates from its attachment: — the place of attachment of a seed or ovule to its support. *Gray.*
- HÍM, *pron.* [A. S. *him*.] The objective of *he*. *Wright.*
- HÍM-A-LÁY-ÁN, *a.* (*Geog.*) Pertaining to the Himalaya mountains in India.
- HÍM-SÉLF, *pron.*, in the nominative or objective case. *He* or *him*; — used emphatically and

Ā, Ê, Ī, Ō, Ū, Ȳ, long; Ā, Ē, Ī, Ō, Ū, Ȳ, short; A, E, I, O, U, Y, obscure; FARE, FĀR, FĀST, FĀLL; HĒIR, HĒR;

EXHIBIT 5



26 Pub. Lands Dec. 446, 1898 WL 957 (D.O.I.)

Page 1

26 Pub. Lands Dec. 446, 1898 WL 957 (D.O.I.)

Department of the Interior (D.O.I.)

DOUGLAS COUNTY, WASHINGTON

March 31, 1898

RIGHT OF WAY-HIGHWAY-SECTION 2477, R. S.

It was not intended by section 2477 of the Revised Statutes to grant a right of way for highways over public lands in advance of an apparent necessity therefor.

(W. V. D.)

With their letter of April 16, 1897, the local officers at Waterville, Washington, transmitted to your office a certified copy of an order of the board of county commissioners of Douglas County, Washington, purporting to be an acceptance of rights of way claimed to be granted by section 2477 of the Revised Statutes, and asking that the right of way so granted and accepted be made a matter of reservation in all subsequent patents issued for lands affected thereby.

Your office considered the matter, on April 28, 1897, and held that the statute does not authorize the exclusion of such right of way from patents issued for lands subject to such an easement. The county commissioners have appealed to the Department.

Section 2477 of the Revised Statutes is as follows:

The right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted.

Claiming to act under authority of the laws of the State of Washington, the board of county commissioners of Douglas county, in that State, passed the following order:

BE IT REMEMBERED: That, on the 6th day of April A. D. 1897, at a regular meeting of the board of county commissioners of Douglas county, State of Washington, said meeting being duly held and all members of said board being present, on motion, it was ordered that the right of way for the construction of highways over public lands, as granted by act of Congress (Section 2477 Revised Statutes), be accepted, and the same is hereby accepted, as far as said grant relates to said Douglas county, that is to say to the extent of thirty feet (30) on each side of all sections lines in said county; it is hereby declared that all sections lines in said county shall be, and the same are hereby declared to be, the center lines of highways and public roads in said county, wherever said section lines are bounded by public lands, and said highways are hereby declared to be sixty feet (60) in width; wherever any such section line shall be found to lie between public land on one side and private land on the other, such highway shall be sixty feet in width, and be wholly on such public land and bounded on one side by such section line.

It is further ordered that E. K. Pendergast, prosecuting attorney, for said county and state, file a certified copy of this order in the United States Land Office at Waterville, Washington, and take all necessary steps

26 Pub. Lands Dec. 446, 1898 WL 957 (D.O.I.)

Page 2

to have the Hon. Commissioner of the General Land Office exclude such easement and right of way from all patents issued for lands in said county, which shall be claimed or settled upon subsequent to the date hereof.

Dated this 6th day of April A. D., 1897.

It is urged on appeal that it is the duty of the land department of the government to execute this statute, that it authorizes the exclusion of the right of way thereby granted from patents issued for lands to which an easement may have attached by virtue thereof, and that the propriety of such action is manifest.

The declaration by the board of county commissioners, that highways shall be extended along all section lines designated by the public surveys in said county sixty feet in width, that where the section lines are bounded on both sides by public lands, such section lines shall be the center of the highway, and that where any such section line shall be found to lie between public land on one side and private land on the other, the highway shall be wholly on such public land and bounded on one side by such section line, embodies the manifestation of a marked and novel liberality on the part of the county authorities in dealing with the public land.

There is no showing of either a present or a future necessity for these roads or that any of them have been actually constructed, or that their construction and maintenance is practicable. Whatever may be the scope of the statute under consideration it certainly was not intended to grant a right of way over public lands in advance of an apparent necessity therefor, or on the mere suggestion that at some future time such roads may be needed.

If public highways have been, or shall hereafter be, established across any part of the public domain, in pursuance of law, that fact will be shown by local public records of which all must take notice, and the subsequent sale or disposition by the United States of the lands over which such highways are established will not interfere with the authorized use thereof, because those acquiring such lands will take them subject to any easement existing by authority of law.

The decision appealed from is affirmed.

Secretary Bliss to the Commissioner of the General Land Office

26 Pub. Lands Dec. 446, 1898 WL 957 (D.O.I.)

END OF DOCUMENT

EXHIBIT 6

5737

A TREATISE
ON
THE PRINCIPLES AND PRACTICE
OF
LEVELLING,

SHOWING ITS APPLICATION TO PURPOSES OF CIVIL ENGINEERING PARTICULARLY IN THE CONSTRUCTION OF ROADS,

WITH

MR. TELFORD'S RULES FOR THE SAME;

With an Appendix,

CONTAINING A DESCRIPTION OF

MR. MACNEILL'S DYNAMOMETER,

OR

INSTRUMENT FOR ASCERTAINING THE COMPARATIVE MERIT OF ROADS, AND THE STATE OF REPAIR IN WHICH THEY ARE KEPT.

BY FREDERICK W. ^{Walter}SIMMS,

SURVEYOR AND CIVIL ENGINEER,

Late of the Royal Observatory, Greenwich,

Author of a Treatise on the Principal Mathematical Instruments employed in Surveying, Levelling, and Astronomy.

To which have been added

TABLES FOR CALCULATING EARTH-WORK,

AND NOTES BY

^{John Henry}J. H. ALEXANDER,

CIVIL ENGINEER.

WITH PLATES AND WOOD CUTS

BALTIMORE:

PUBLISHED BY FIELDING LUCAS, JR.

138 Market street.

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JOHN D. TOY, PRINTER.

THE following pages were
Publisher, in consequence of
he had received for a book
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method of taking levels in
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worked out in full, both by
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also suggested that I should
choice of a line of direction
or rail road, preparatory to
I have given an abstract of
for making and repairing road
valuable work of Sir Henry

SHAPE, OR TRANSVERSE SECTION.

The roadway should be 30 feet broad; the centre should be 6 inches higher than the level of the sides, where the junction of the surface, with the sloping edge of the footpaths, or other defining bounds of the roadway, form the side channels; at 4 feet from the centre (on each side) the surface should be half an inch lower; at 9 feet, it should be 2 inches lower; and at 15 feet, its extreme edge, it should be 6 inches lower; this will give the form of a flat ellipse, which is well adapted for carrying off the water to the side channels, without making the cross section of the road too round, and allows the sun and wind to have a greater effect in evaporation, and keeping the road dry. In giving the surface one uniform curvature from side to side, the surveyor should use such a level as described at page 106.

The footpaths should be 6 feet broad, and have an inclined surface of 1 inch in a yard towards the road; its surface should not be lower than the level of the centre of the road, and the edge should be sloped down (and covered with green sod) to meet the roadway, and form the side channel to carry off the water from the surface.

DRAINAGE.

All open main drains should be cut on the field side of the road fences, and should lead to the natural water-courses of the country; in general, they should be 3 feet deep below the bed of the road; 1 foot wide at bottom, and from 3 to 4 feet wide at top. Stone drains and culverts should also be made under the road, and continued to the open side drains, or ditches; side channels (before named) must be made on the road side, with openings of masonry into the cross drains, to prevent any water lying on the road, it being necessary, in order to preserve the surface of a road perfect, that it be kept completely dry. All land springs ought to be carried from the site of the road by under-draining.

FENCES.

'All road fences should be kept as low as possible, never being allowed to exceed 5 feet in height, in order that they may not intercept the sun and wind, and diminish their effects in producing evaporation;' and for the same reason no trees should be allowed to grow by the side of a road; for by keeping the roads wet, they occasion the rapid wear of the materials of which they are formed.

The hardest description as basalt, granite, quartz parts of the United Kingdom Hartshill stone of Leicester Staffordshire, and Warwicks now commonly in use. argillaceous structure, which is destroyed, when wet, by great expense in scraping; Limestone is defective in much too weak for the surface. The hardest flints are never softer kinds are quickly made heavy and dirty roads the harder sorts of stone consists of limestone, sandstone; not; for it wears so rapidly always consists of a large reduced, and prevents the road from attaining the When the materials are a cubical form, not exceeding dimensions, and should be 6 inches diameter. When it consists of 1½ inches in size only a road; all larger pebbles should be used for the sides of the road.

[The English geological great extension which they local appellation, we have intelligible by the following have the kind permission of the

'In the tide water district Hudson, there are no rock engineer is obliged to substitute igneous to the primary rock seldom in sufficient quantities.

In the primary districts of the Atlantic states, stone suitable

* Abridged from

A TREATISE

OR TRANSVERSE SECTION.

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be 6 feet broad, and have an inclined surface towards the road; its surface should not be lower than the centre of the road, and the edge should be covered with green sod) to meet the roadway, and carry off the water from the surface.

DRAINAGE.

should be cut on the field side of the road lead to the natural water-courses of the country; it should be 3 feet deep below the bed of the road; 1 foot from 3 to 4 feet wide at top. Stone drains also be made under the road, and continued to the ditches; side channels (before named) must be made, with openings of masonry into the cross ditches, any water lying on the road, it being necessary, in the surface of a road perfect, that it be kept free from springs ought to be carried from the site of draining.

FENCES.

should be kept as low as possible, never being 5 feet in height, in order that they may not interfere with the drainage, and diminish their effects in producing the same reason no trees should be allowed to grow on the side of a road; for by keeping the roads wet, the wear of the materials of which they are

ON LEVELLING.

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ROAD MATERIALS.

The hardest description of stone should always be preferred, such as basalt, granite, quartz, &c. The whinstones, found in different parts of the United Kingdom, Guernsey granite, Mountsorrel and Hartshill stone of Leicestershire, and the pebbles of Shropshire, Staffordshire, and Warwickshire, are among the best of the stones now commonly in use. The schistous rocks being of a slaty and argillaceous structure, will make smooth roads, but they are rapidly destroyed, when wet, by the pressure of the wheels, and occasion great expense in scraping, and constantly laying on new coatings. Limestone is defective in the same respect. Sandstone is generally much too weak for the surface of a road; it will never make a hard one. The hardest flints are nearly as good as the best limestone; but the softer kinds are quickly crushed by the wheels of carriages, and make heavy and dirty roads. Gravel, when it consists of pebbles of the harder sorts of stones, will make a good road; but when it consists of limestone, sandstone, flint, and other weak stones, it will not; for it wears so rapidly, that the crust of a road made with it always consists of a large portion of the earthy matter to which it is reduced, and prevents the gravel from becoming consolidated, and the road from attaining that perfect hardness it ought to possess.* When the materials are stone, they should be broken to a size of a cubical form, not exceeding 2 inches and a half in their largest dimensions, and should be capable of passing through a ring of that diameter. When it consists of gravel, the pebbles which are from 1 to 1½ inches in size only should be used for the middle part of the road; all larger pebbles should be broken; the smaller stones may be used for the sides of the roads and the footpaths.

[The English geological names being so different from ours, in the great extension which they have given to what was originally a mere local appellation, we have thought to render this paragraph more intelligible by the following extract, for the insertion of which we have the kind permission of Mr. P. T. Tyson.

'In the tide water districts of the United States, south of the Hudson, there are no rocks in place suitable for road metal; and the engineer is obliged to substitute gravel, except in some places contiguous to the primary rocks, where boulders are found, but these are seldom in sufficient quantity to be available.

In the primary districts, which run south-westerly through the Atlantic states, stone suited for road metal is abundant. The best is

* Abridged from Sir H. Parnell on Roads, page 271.

that in which the hornblende constitutes all or nearly all the rock, and its structure is fine grained or compact; it is expensive to break it down, owing to its great tenacity, but it forms the most durable material that can be obtained for a road metal. Next to it in utility, we may name the quartz, which forms veins or beds in gneiss, granite, mica slate, and argillite, frequently of sufficient extent to be applicable to extensive operations.

Granite sometimes contains sufficient quartz to be hard enough for a road metal; but when felspar predominates, it should be sedulously avoided, because this substance is readily decomposed and is then easily crushed.

Gneiss generally contains too much felspar or mica to be useful, and should never be resorted to if it can be avoided. Mica slate and argillite are wholly inapplicable.

On the western borders of the primary rocks there is a quartz rock passing sometimes into sandstone, which forms a good metal, and perhaps ranks next to the hornblende rocks. As we proceed further west, the rocks are either sandstones, slates, shales, or limestones. The sandstones are sometimes hard and tenacious, and will answer a tolerable purpose when nothing better can be had. Slates and shales are inadmissible, except as a covering to a dry sandy road, when hard stones cannot be procured. Limestones are frequently hard enough to suit for a road metal, and are generally better than sandstones, but the hardest varieties only should be used.²—A. E.]

THE FOUNDATION AND DISPOSITION OF MATERIALS.

Before the foundation is laid, the surface on which it is to rest must be prepared, by making it level from side to side, and, if necessary, raising it so that the finished surface of the road may not be below the level of the adjoining fields. If the subsoil be wet and elastic, it must be rendered non-elastic by whatever means is best adapted to overcome the cause, as drainage, &c. The foundation should consist of a rough close-set pavement, of any kind of stones that can be most readily procured; those set in the middle of the road should be 7 inches in depth; at 9 feet from the centre, 5 inches; at 12 feet from the centre, 4 inches; and at 15 feet, 3 inches. They should be set with their broadest faces downwards, and lengthwise across the road; and no stone should be more than 5 inches broad on its face. The irregularities of the upper part of the pavement should be broken off with the hammer, and all the interstices should be filled with stone chips, firmly wedged, or packed by hand with a light hammer; so that, when the pavement is finished,

there may be a convexity of the centre.

'The middle 18 feet of broken stones, of the form Materials,' to the depth of first put on, and worked in to rake in the ruts until the after which the remaining 2

'The paved spaces on each coated with broken stones, gravel, up to the foot path, of road, so as to make the whole 6 inches from the centre to whole of the materials show binding of an inch and a half free from clay or earth.'

The footpaths should be strong gravel, or small broken stones, 6 inches deep. The annexed section of a road constructed rules.

REPAIRING

Towards the latter end of the year a road should be put into a state to preserve it from being injured following winter; between winter and spring, all repairs, and materials, should be done. It should be done at a time, and when the ground is soon be worked into the road, and crushed into powder.

All ruts and hollows should be filled as they appear. The sides should be continually kept from obstruction; and all damage sustained be made good as soon as possible.

'A road should be scraped so as never to have half an inch of mud should not be suffered to remain in the side channels running of water in them.'

ON LEVELLING.

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all or nearly all the rock, it is expensive to break. It forms the most durable material. Next to it in utility, are beds in gneiss, of sufficient extent to

to be hard enough for it should be sedulously decomposed and is then

or mica to be useful, avoided. Mica slate and

there is a quartz rock forms a good metal, and as we proceed further shales, or limestones, are used, and will answer a purpose. Slates and shales make a sandy road, when hard enough, frequently hard enough, is better than sandstones, &c. A. E.]

ON OF MATERIALS.

on which it is to rest side to side, and, if surface of the road may not be the subsoil be wet and whatever means is best, &c. The foundation of any kind of stones in the middle of the road from the centre, 5 inches; and at 15 feet, 3 inches. It goes downwards, and should be more than 5 feet of the upper part of the road, and all the interstices wedged, or packed by the pavement is finished,

there may be a convexity of 4 inches in the breadth of 15 feet from the centre.

'The middle 18 feet of pavement should be coated with hard broken stones, of the form and size described under the head 'Road Materials,' to the depth of 6 inches. Four of these six inches to be first put on, and worked in by carriages and horses; care being taken to rake in the ruts until the surface becomes firm and consolidated after which the remaining 2 inches are to be put on.'

'The paved spaces on each side of the 18 middle feet should be coated with broken stones, or well cleansed strong gravel, up to the foot path, or other boundary of the road, so as to make the whole convexity of the road 6 inches from the centre to the sides of it; and the whole of the materials should be covered with a binding of an inch and a half in depth of good gravel, free from clay or earth.'

The footpaths should be made with a coating of strong gravel, or small broken stones, at least 6 inches deep. The annexed engraving exhibits a section of a road constructed according to the above rules.

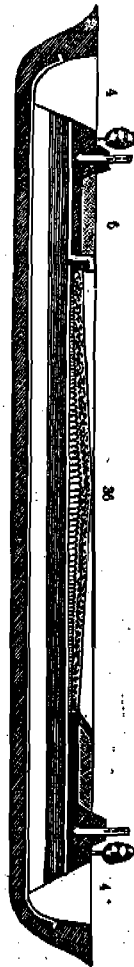
REPAIRING ROADS.

Towards the latter end of the autumn of each year, a road should be put into a complete state of repair, to preserve it from being broken up during the following winter; between which time and the preceding spring, all repairs, by laying on of new materials, should be done. If thin coatings be laid on at a time, and when the ground is wet, they will soon be worked into the surface without being crushed into powder.

All ruts and hollows should be filled up as soon as they appear. The side channels and drains should be continually kept clean, and free from obstruction; and all damage they may have sustained be made good as soon as discovered.

'A road should be scraped from time to time, so as never to have half an inch of mud upon it; the mud should not be scraped into, or allowed to remain in the side channels, so as to stop the running of water in them.'

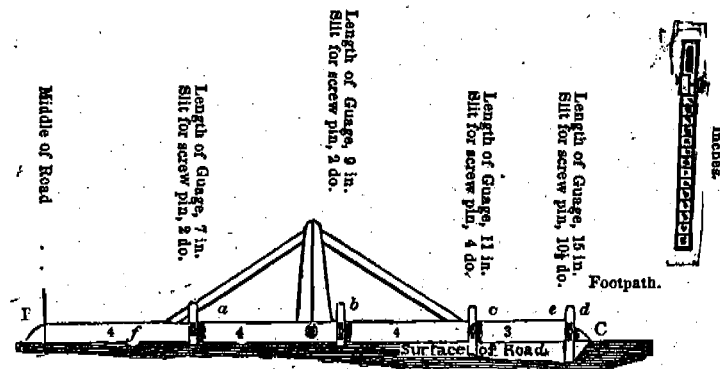
14



'The hedges should be kept constantly clipped and cut as low as possible, without rendering them unfit for confining cattle; and all projecting branches of the trees in the fences should be lopped.

In the minutes of evidence given before a select committee of the House of Commons on the subject of steam carriages, we find the following paragraph as part of the evidence given by Mr. Macneill.

'Well-made roads, formed of clean, hard, broken stone, placed on a solid foundation, are very little affected by the atmosphere; weak roads, or those that are imperfectly formed of gravel, flint, or round pebble, without a bottoming or foundation of stone pavement or concrete, are, on the contrary, much affected by the changes of the weather. In the formation of such roads, and before they become bound or firm, a considerable portion of the subsoil mixes with the stone or gravel, in consequence of the necessity of putting the gravel on in thin layers; this mixture of earth or clay, in dry warm seasons, expands by the heat, and makes the road loose and open; the consequence is, that the stones are thrown out, and many of them are crushed and ground into dust, producing considerable wear and diminution of the materials; in wet weather, also, the clay or earth, mixed with the stones, absorbs moisture, becomes soft, and allows the stones to move and rub against each other when acted upon by the feet of horses or wheels of carriages. This attrition of the stones against each other wears them out surprisingly fast, and produces large quantities of mud, which tend to keep the road damp, and by that means increase the injury.'



The above engraving represents the level employed by road surveyors in laying out new works. On the horizontal bar B C are

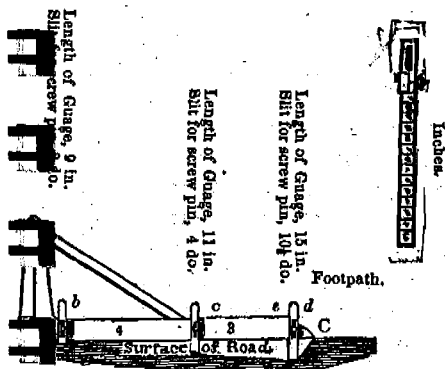
placed four sliding gauges, *a*, grooves cut in the horizontal bar depth below the bottom edge of position by a thumb-screw. instrument, taken through the l to a larger scale; the remaining explanation.

For laying out slopes, the el best instrument that can be used

A TREATISE

kept constantly clipped and cut as rendering them unfit for confining cattle; of the trees in the fences should be fence given before a select committee s on the subject of steam carriages, we s part of the evidence given by Mr.

l of clean, hard, broken stone, placed on a e affected by the atmosphere; weak tly formed of gravel, flint, or round ng or foundation of stone pavement or much affected by the changes of the such roads, and before they become ble portion of the subsoil mixes with the ence of the necessity of putting the gravel ure of earth or clay, in dry warm at, and makes the road loose and open; stones are thrown out, and many of them dust, producing considerable wear and , in wet weather, also, the clay or earth, sorbs moisture, becomes soft, and allows ainst each other when acted upon by carriages. This attrition of the stones them out surprisingly fast, and produces tend to keep the road damp, and by



represents the level employed by road rks. On the horizontal bar BC are

ON LEVELLING.

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placed four sliding guages, *a, b, c, d*, which move in dove-tailed grooves cut in the horizontal bar, and when adjusted to their proper depth below the bottom edge of the level, can be firmly fixed in their position by a thumb-screw. A section of this portion of the instrument, taken through the line *e, f*, is given on the right, drawn to a larger scale; the remaining parts of the instrument require no explanation.

For laying out slopes, the clinometer, described at page 96, is the best instrument that can be used.

EXHIBIT 7

CARTER GOODRICH

GOVERNMENT PROMOTION
OF AMERICAN
CANALS AND RAILROADS
1800-1890



COLUMBIA UNIVERSITY PRESS
NEW YORK AND LONDON

1

THE SPIRIT OF
IMPROVEMENT

This is a study of the role of American governments—federal, state, and local—in the creation of the facilities of inland transport. In today's terms, it is an analysis of an important aspect of development policy, the provision of social overhead capital, and of the relations between public promotion and the efforts of private enterprise. In the language of the time, the issue was that of internal improvements. The older phrase carries the connotation which the modern student must not overlook—of a movement that called for the exercise of public spirit as well as the search for immediate economic gain. To improve the country's natural advantages by developments in transportation was, in the eyes of Washington and many others, a duty incumbent both on governments and on individual citizens.¹ Even before the American Revolution, the American Philosophical Society maintained a standing Committee on American Improvements, and its members went out one winter into the frozen swamps to study the prospects of a canal to connect the Chesapeake and the Delaware. They were later praised as men "whose views, extending beyond themselves, [were] employed upon objects of general benefit and utility."² When canal and railroad companies were organized, individuals were often urged to buy stock not only for the dividends they would receive, but also for the satisfaction of bearing an honorable part in a great state or national work. One railroad

SPIRIT OF IMPROVEMENT

5

what similar issues are raised by government subsidies to the merchant marine and by aids to ocean navigation. Even within inland transport, it will not give equal emphasis to all forms of governmental encouragement.⁶ Its principal concern is with the cases in which the users of the improvement were to pay for the services rendered. As free roads replace turnpikes, as local fee-charging navigation companies disappear, and as river and harbor improvement become services rendered without charge by the federal government, the building of roads and the clearing of rivers become of less interest to the study. Its main theme is the relation between public and private activity in the creation of canals and railroads.

Limitation of the discussion to toll- and freight-charging enterprises has the advantage of concentrating attention on those aspects of development which required deliberate choice between alternative private and public means. It was obvious that business enterprise could not be expected to provide facilities from which revenue could not be collected. But if charges were to be made for the service, and profits were a possibility, there was room for the selection of either a private or a public agency or—as the American experience showed—of a remarkable variety of combinations of the two. The focus is therefore on the controversial, and still timely, issue of competition and cooperation between government and business.

Even with these limits, the field is a wide one. The number of cases of government promotion, and the volume and importance of public investment, have been greater than is commonly remembered. Local government authorities aided turnpikes, canals or railroads in several thousand cases and in almost every state. All but a few of the state governments carried on their own programs of public improvements or gave their support to transportation companies by loans or subscriptions. Action by the federal government was less frequent and less continuous, but its history contains a period of prolonged discussion of a national

SPIRIT OF IMPROVEMENT

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were little developed in most parts of the world. In the passage already cited, Thorold Rogers somewhat complacently attributed the resort of "foreign countries" to public enterprise to their varying degrees of deficiency in "the habits of association and enterprise." Latin American experience illustrates the distinction between exploitative and developmental enterprises, since its relatively few examples of purely private undertakings include the roads that carry coffee to Santos and sugar from the cane-fields to the Cuban ports. Bolivia provides an exceptionally exact example: the two railroads that take the tin from the great mines to the coast were built, and until very recently were owned and operated by private British interests, while the other railroads are all governmental.

Each of the three points of difference is significant for the explanation of American policy. Shortage of local capital was from the beginning a principal argument for governmental action. "The population along the contemplated line of the road," read one typical plea, "though industrious and frugal, are too poor to build the road."¹⁴ Reviewing the history of state action for internal improvements before the United States Senate in 1850, William H. Seward declared that "a great and extensive country like this has need of roads and canals earlier than there is an accumulation of private capital within the state to construct them."¹⁵ During the decade that followed American railroad companies were for the first time able to raise substantial sums in the European market, but lack of capital *within* a state continued to be used as an argument for government aid borrowing. "No new people," said Henry Varnum Poor, "can afford to construct their own railroads"; and the *Railroad Journal* under his authorship frequently made the distinction between the older regions, where abundance of capital made aid unnecessary, and the newer areas, where government assistance was still required.¹⁶

The lack of large-scale corporate enterprise was also a factor in American decisions. In the early days of internal improvements,

SPIRIT OF IMPROVEMENT

diversity of the expedients employed in the promotion of these American improvements. All levels of government took part in the movement, and public and civic and private efforts were brought together in an extraordinary variety of combinations.

Some commentators on internal improvements, contemporary and modern, have written as if the word governmental were a synonym for federal. A Colorado promoter, for example, boasted that he had built his railroad "without a subsidy of any kind" and then went on to recount his success in inducing three countries to issue bonds on its behalf.¹⁹ Similarly, a railroad historian wrote that the refusal of Congress to vote assistance saved the Baltimore and Ohio from governmental interference, though the state of Maryland and the city of Baltimore were soon to hold a majority of its stock and to appoint a majority of its directors.²⁰ To consider internal improvements in terms of federal policy alone would miss the greater part of the story. Individual amounts of local government aid, like the subscription of Brazil Township, Clay County, Indiana, to a forgotten North and South Railroad, or even of state aid, like Virginia's assistance to the Upper Appomattox Company or to the turnpike through Snicker's Gap, were often very small. Yet the total volume of financial investment by state and local governments was considerably greater than that of the federal government, and their activities are no less instructive to the student of the relation between government and private enterprise.

At each level of government, there was a choice to be made among the major alternatives of public enterprise, of mixed enterprise in which government agencies shared ownership and control with individual investors, and of loans or donations to private corporations. The federal government built the National Road before turning it over to the states for operation and maintenance. New York State dug the Erie Canal as a public work and others followed its example. Georgia built and operated

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AN ERA OF
NATIONAL PROJECTS

The first decade of the nineteenth century marked the beginning of an era of national projects of internal improvement. By this time frontier settlement had passed the barrier of the Appalachian Mountains, but transportation had not yet bound the new areas to the economy of the seaboard states. In 1806 Congress authorized the first surveys for the National Road. Two years later, Albert Gallatin, the Secretary of the Treasury, presented to the Senate his Report on Roads and Canals. The first action initiated the one major developmental enterprise of the time to be constructed directly by the federal government. The second was the earliest and most distinguished attempt to formulate a comprehensive national plan of internal improvements.¹

These actions represented a new turn in national policy. Washington's enthusiasm for improvements had been channeled through other agencies, and little attention was paid to Hamilton's statement, in the Report on Manufactures, of the advantages of federal action. The early Congresses voted appropriations for a few lighthouses and spent much time designating and redesignating the routes for post roads. Though it was sometimes recognized that "unprofitable roads might be established—from the partiality of members to their own district and country," the alternative of leaving the selection to the Executive was rejected as a greater evil and even described as a dangerous advance "toward Mon-

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archy.”² But it was only occasionally that voices were raised to advocate the federal construction of post roads, as against the mere choice of routes; and the most elaborate of these proposals, under which the government would have subscribed to the stock of turnpike companies for the improvement of the principal post road from Maine to Georgia, aroused little interest.³

On the other hand, there was a considerable background of state and local, as well as private, effort for the improvement of transportation. Throughout most of the colonial period the means of inland communication had remained extremely primitive. Roads were mainly the responsibility of local public authorities, and it was they who made the arrangements with ferry-men for the stream crossings. In the early days of scanty traffic, the towns had to give these men other inducements besides the right to collect tolls; as traffic increased, the towns were sometimes able to charge them for the privilege instead.⁴ In certain cases the provincial authorities gave directions and aid for through lines of road or for roads to open up the frontier. Long afterwards, Senator Seward cited as a precedent for internal improvements an act of the early eighteenth century by which the province of New York appropriated money for a road westward from the lower Hudson, but the scale of the effort may be gauged by the requirement that the limbs of the trees had to be cut off high enough to permit the passage of a carriage with a calash top.⁵ Larger projects of river improvement and canal building and of the construction of "artificial" roads were projected and undertaken in the second half of the century. "But the dark and distressing period of the revolution," as a Pennsylvania improvement society recalled, "necessarily suspended all improvements of this nature, in every part of America, until the glorious era of the peace and independence of the United States."⁶

When progress could be resumed, much of the leadership was taken by private enterprise. Before the time of Gallatin's Report two principal canals were built without financial aid from public

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authorities. The Santee, extending from Charleston, South Carolina, was opened in 1800, and the Middlesex, from Boston to Lowell on the Merrimack, in 1803. Each served to connect a seaport which lacked a major river with a river which lacked a satisfactory port. A number of toll-bridge companies sprang up, particularly in New England, superseding the older ferry proprietors, and were often financially successful. More important was the development of turnpike companies, of which over seventy had been chartered by 1800 and several hundred by the time of Gallatin's inquiry. These were crisscrossing the northern and middle states with a network of moderately improved toll roads, and Gallatin's informants were able to indicate certain main lines of travel formed by connecting turnpikes. These enterprises, performing "a hitherto governmental function," were operating with little or no public aid. In New England the turnpike companies received no public funds, though those in Connecticut profited by the exemption of their stock from taxation. On the other hand, New Jersey aided a turnpike company in 1804, and the city of Albany became the largest stockholder in the First Great Western Turnpike. In 1806 the Pennsylvania legislature debated the general policy of state participation and made its first subscription to the stock of a company which undertook to build a road across the mountains to the West.⁷

Meanwhile there had been a number of examples of state participation in projects of canal building and river improvement. The movement began, according to the Pennsylvania Society, "in the states of Virginia and Maryland, upon the Potomac, under the auspices of the illustrious Washington" and spread "with a noble emulation of public spirit" to other states "according to their natural advantages." Maryland and Virginia paid more than \$150,000 for 340 of the 701 shares of the Potomac Company. Virginia was also interested in another and rival route to the West and in a connection with the South, and the state paid \$70,000 for half of the stock of the James River Company and

the settlers beyond the mountains was vital to the cementing and preservation of the Union. According to one correspondent, the best way to serve this patriotic purpose, and at the same time to "wither the consequence of Quebec," was to build a road uniting "the navigation of our great western lakes with that of the Atlantic." Combining the language of the classics with that of the Great North Woods, he described his project as "an Appian Way or national portage." Moses Brown, the Quaker manufacturer of Providence, advanced still another argument for federal action. Noting, as had many others, the intercity and interstate jealousies that had impeded the progress of improvements, he asked: "Would not such improving authority be proper to be vested in the General Government?"¹²

In one major case, that of the National Road, the general government had already assumed authority for internal improvement. This undertaking found its occasion in the settlement of the Northwest Territory and in the major political decision by which the public lands in the region were to remain at the disposition of the federal government. Even before the first state in the area was admitted to the Union, federal power over the land had been used to advance internal improvements. In an early example of the pragmatic arrangements linking public purpose with profitable private speculation, Ebenezer Zane, a pioneer entrepreneur of Wheeling, had marked out and cleared an important land route across southeastern Ohio (Zane's Trace) in return for the privilege of taking up town sites at the river crossings where he was certain that settlements would arise.¹³ As Ohio's admission approached, improvement policy became a subject of more general discussion. Early in 1802, Gallatin proposed in a letter that part of the proceeds of the sale of public lands be used for the building of roads from "the navigable waters emptying into the Atlantic to the Ohio, and afterwards continued through the new State." Construction was to be carried on by the federal government with the consent of the states through

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which the road was to pass. He later endorsed his copy of the letter, "Origin of the National Road";¹⁴ it did in fact outline the policy which was followed. The Enabling Act of 1802, under which Ohio became a state, provided that five percent of the net proceeds of public land sold within its area should be applied to this purpose; and Congress later accepted the stipulation of the Ohio legislature that three fifths of the money should be spent on roads within the state.

The two percent fund began to accumulate, and late in 1805 a Senate committee reported in favor of building the road from Cumberland on the Potomac to Steubenville or Wheeling on the Ohio, crossing the mountains by the general route of the historic Braddock's Road. Considering it "an indelicacy" to assume that the Senate needed to be convinced of the importance of the undertaking, the Committee members devoted their main attention to the geographic advantages of the Cumberland route. Since this would provide direct connections for Baltimore and Washington, as against possible alternative routes from Philadelphia and Richmond, the choice was a controversial one and representatives from Pennsylvania and Virginia cast 29 of the 50 nays in a close vote in the House. In March, 1806, however, Congress adopted An Act to Regulate the Laying Out and Making a Road from Cumberland, in the State of Maryland. This authorized the President to appoint commissioners for laying out the road, to determine its location after receiving their report, and to request the necessary consent from the states concerned.¹⁵ The Commissioners reported in December, noting as one of the difficulties of their task "the solicitude and importunities of the inhabitants of every part of the district, who severally considered their grounds entitled to a preference."¹⁶ The state of Pennsylvania made its consent to the project contingent on the inclusion in the route of Uniontown and Washington, Pennsylvania. President Jefferson was somewhat disillusioned by this official expression of "solicitude" for local interests, but decided to accept