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STUDENT NOTES

INJURY TO SURFACE AND COAL OF A CONTIGUOUS TRACT DUE TO THE PROJECTION OF FORCE RESULTING FROM MINING

Between conterminous properties the rights of support both lateral¹ and subjacent² exist and are said to be absolute.³ Such rights are sometimes termed easements in the adjoining tenement.⁴ The general conception of the nature of interference with the right of subjacent support is the wrongful withdrawing of a supporting stratum from under a superjacent stratum causing the latter to fall;⁵ interference with lateral support usually is associated with the withdrawing of vertical support causing the sides of the conterminous estate to rend, break and fall.⁶ But in each of these instances there is a physical change, a rending, breaking and falling of the property of the superjacent or contiguous estate.

It is submitted that the use of the adjoining tract may be interfered with and changes made therein without causing it to rend, crack and fall, but by casting, or causing forces to be cast into and on it in such manner that its value and use may be greatly impaired. The facts in the case of *Victor Mining Co. v. Morning Star Mining Co.*,⁷ suggest the problem. Two adjoining owners were mining near the dividing line. One robbed the supports of the superjacent strata. The other subsequently mined his pillars and tried to enjoin the first from completing the retreat, stating that if the pillars were further robbed by the other that the superincumbent strata would fall, injuring the latter's mine. The court dismissed the suit because the plaintiff contributed to the wrong of which he complained; but the holding is not material to this discussion. If mining is begun, forces are set in motion which are not and cannot be confined to the mined tract.⁸ When one mines

¹ Pollock v. Pittsburgh, etc., Ry. Co., 275 Pa. 467, 119 Atl. 457 (1923).

² Noonan v. Pardee, 200 Pa. 474, 50 Atl. 255 (1901).

³ LINDSEY, MINES (3d ed. 1914) 832.

⁴ "Every man has the natural right to the use of his land in the situation in which it was placed by nature surrounded and protected by the soil of the adjacent lots. He has a right to the support of the adjoining soil and to that extent has an easement in his neighbor's soil and when the soil is removed his easement is directly interfered with." Ferrand v. Marshall, 21 Barb. 409 (N. Y. 1855). See also Ryckman v. Gillis, 57 N. Y. 68, 74 (1874).

⁵ HOHFELD, FUNDAMENTAL LEGAL CONCEPTIONS (1923) 160 *et. seq.*

⁶ BARRINGER AND ADAMS, MINES AND MINING (1900) 686, 687, 688.

⁷ 50 Mo. App. 525 (1892).

⁸ Halbaum, *The Great Planes of Strain in the Absolute Roof of Mines* (1905) 30 TRANSACTIONS INST. MIN. ENGRS. 175, 185.

away from the boundary, superjacent disturbances and falls are left in the wake of the retreat.⁹ The distance to which the breaks extend depends upon the roof material.¹⁰ The breaks which are from 50 degrees to 90 degrees from the horizontal extend upward and out toward the mined out area forming an arch, as an arch of a bridge.¹¹ If a strong sandstone or other stratum sufficient to withstand breaking lies a short distance above the coal seam, the roof breaks up to it and no further.¹² The sandstone truncates the arch¹³ and becomes its headstone; the coal vein on all sides acts as an abutment.¹⁴ When the retreat starts from the boundary the vein of coal of the conterminous owner supports the weight of part of the arch¹⁵ which weight before mining it did not support.

The plane of force cast onto the coal of the conterminous owner may make it more difficult for him to mine efficiently his coal. The figure which the coal supports is a cantilever.¹⁶ The weight supported by the cantilever increases directly with the expanse of the arch and the weight it supports.¹⁷ When the conterminous owner mines and the support of the cantilever is robbed part of the coal is subject to a "squeeze".¹⁸ With few ex-

⁹ Tests show that the withdrawal of coal veins of the thickness of three feet, six inches, subjects the cover to subsidence of two feet, the cover being 425 feet thick. This would tend to disprove the "safe depth" theory of mining, the theory that at some depth mining without surface subsidence is possible. In fact this theory is widely questioned. Young, *Surface Subsidence in Illinois* (1916) ILL. STATE GEOLOGICAL SURVEY, Bull. 17, p. 93.

¹⁰ *Ibid.* 90.

¹¹ See Halbaum, *op. cit. supra* n. 8.

¹² Randolph, *The Theory of the Arch in Mining* (1915) 35 *Colliery Engineer* 427.

¹³ The arch may stand for several years but is essentially impermanent. The failure of a natural arch is generally due to the crushing of the coal at its feet. Randolph, *op. cit. supra* n. 12.

¹⁴ BRIGGS, *MINING SUBSIDENCE* (1929) 182.

¹⁵ "The integrity of the arch being destroyed the line of stress must seek a new position . . . Naturally this movement will be no greater than is absolutely necessary to gain a solid footing for the arch, which will again be so near the edge of the coal already crushed that it will fail again in a short while, necessitating a further adjustment of the position of the arch. With this continuing failure and readjustment we have the well-known phenomena of a 'crush' or squeeze advancing slowly over the workings destroying coal as it goes". Randolph, *op. cit. supra* n. 12, at 428.

¹⁶ Halbaum, *op. cit. supra* n. 8, at 187.

¹⁷ See Randolph, *op. cit. supra* n. 12.

¹⁸ In mining parlance a squeeze is the crushing of the coal supports and the pushing of the remaining solid portion into the floor of the mine. The material on which the coal rests is fireclay which is from a few inches to five feet thick. The miner reduces the area on which the coal block rests causing it to be sunk into the clay and the clay to "creep" out from under the coal block. Hall, *Squeezes in Mines and their Causes* (1909) 30 *MINES AND MINERALS* 286.

The following is an indication of the devastating results of squeezes: "It was expected that a large part of this top coal would be recovered when the

ceptions the important coal veins in West Virginia are underlaid with fire clay bottoms.¹⁹ But even a hard slate bottom is subject to a squeeze.²⁰ This added weight on the coal²¹ from the arch may cause the solid coal some distance from the line to be crushed.²² The squeeze impedes the mining of the coal,²³ necessitates extra timbering²⁴ and greater supervision, determines the plan of projection²⁵ and often causes great loss of coal.²⁶ This is an injury to the use of the property of the conterminous owner. It should be noted that there is no direct trespass on the property and that this injury need not be due to negligent mining but is a direct result of reasonable and prudent mining, — the result of the mere withdrawal of the coal. It is submitted that it is more than *damnum absque injuria*; such extensive harm should be actionable.

The injury is not confined to the subsurface strata, but extends to the surface. The corollary of the action of the cantilever is the "draw", or ascending line of strain projecting over and towards the solid coal.²⁷ The draw, in other words, is the lateral extension of the area of settlement, or subsidence beyond the mined area and in advance of the mining operation:²⁸ This draw results in the undulation of the surface causing buildings to lean toward the approaching mining face. As the working face passes on underneath the surface subsides and the buildings resume their original or nearly original positions. Such disturbances can be noticed as much as two hundred feet in advance of the operations.²⁹ This

pillars were mined. But rooms were driven wider than had been anticipated, room pillars were correspondingly thinner, and there were many falls, squeezes and few barriers other than main entry pillars, to prevent the spread of squeezes. In many instances pillar mining was postponed for indefinite periods and much pillar coal and all of the top coal was lost". Lawall, *Mining Methods in West Virginia* (1929) WEST VIRGINIA COLLEGE OF ENGINEERING, Bul. 4, p. 24.

¹⁹ *Ibid.* 22, 69, 84, 85, 87, 110, 151, 216.

²⁰ *Ibid.* 128.

²¹ Coal may be taken out from under a hard stratum to the extent of several acres without a fall resulting. When there is a fall the arching line of stress has a large span which casts weight on the solid coal. The larger the expanse the greater is the force. Randolph, *op. cit. supra* n. 12, at 428.

²² *Ibid.*

²³ Lawall, *op. cit. supra* n. 18, at 113.

²⁴ For the benefit of those not familiar with mining problems, it may be said that the office of timbering in mining is to prevent roof fragments from falling out and injuring workmen. It in no manner supports the superjacent stratum. Halbaum, *op. cit. supra* n. 8, at 180.

²⁵ Lawall, *op. cit. supra* n. 18, at 174.

²⁶ *Ibid.* 168.

²⁷ Halbaum, *op. cit. supra* n. 8, at 187.

²⁸ Louis, *A Contribution to the Theory of Subsidence* (1923) 64 TRANSACTIONS INST. MIN. ENGRS. 257.

²⁹ Kirkup, *Discussion, Longwall Workings* (1904) 27 TRANSACTIONS INST. MIN. ENGRS. 316, 321.

is substantiated by several observations of effects of mining under buildings in Illinois. Disturbances occurred in the buildings, causing cracks in the walls and foundations, as the workings approached. On passing under the cracks closed up and the buildings settled, sometimes irregularly.³⁰ This subsidence in advance of the operations is due to the bending of the superjacent strata toward the disturbed area of mining³¹ and probably to the compression of the coal under the cantilever. This disturbance in advance of operations may cause injury beyond the boundary. This action, too, is a natural result of mining and always occurs in some degree. It is submitted that the weight of an average building does not add appreciably to cause the result, that any damage from this form of subsidence to the surface or buildings thereon is not *damnum absque injuria* but, too, the inevitable result of mining and should be actionable.

—JOHN L. DETCH.

³⁰ Herbert and Rutledge, *Subsidence Due to Coal Mining in Illinois* (1927) U. S. DEP'T OF COMM., Bul. 238, pp. 26, 42.

³¹ BRIGGS, MINING SUBSIDENCE 205.