SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1937

No. 161

SOUTH CAROLINA STATE HIGHWAY DEPARTMENT, SOUTH CAROLINA PUBLIC SERVICE COMMISSION, ET AL.,

Appellants,

vs.

BARNWELL BROTHERS, INC., POOLE TRANSPORTATION, INC., HORTON MOTOR LINES, INC., ET AL.,

Appellees.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF SOUTH CAROLINA.

BRIEF FOR APPELLANTS.

Opinion of the Lower Court.

The opinion of the specially constituted District Court of the United States for the Eastern District of South Carolina, filed January 20, 1937, is reported in 17 Fed. Supp., p. 803, and is found on page 55 of the record.

Jurisdictional Statement.

The statement as to jurisdiction required by Rule 12 of this Court, was filed on June 1, 1937, and probable jurisdiction was noted on October 11, 1937.

Statement of Case.*

This case is an appeal from the final decree of the specially constituted District Court of the United States for the Eastern District of South Carolina entered by that court on January 20, 1937 (R. 85). The decree permanently enjoins the enforcement of certain sections of a statute of South Carolina which limit the weight and width of motor trucks which may be used on its highways in interstate commerce. The injunction is limited to the plaintiffs below, while they are engaged in interstate commerce on certain designated highways only and such other Federal aid highways as may be of standard concrete, or asphalt and concrete construction (R. 85).

Statute Involved.

The statute of South Carolina the validity of which is involved herein is Act No. 259, approved April 28, 1933, entitled in part, "An Act to Regulate and Limit the Use of the Public Highways in the State by Motor Trucks, Semi-Trailer Motor Trucks, Semi-Trailers and Trailers; * * *" and is found in Vol. 38, St. at Large, p. 340 (Appendix I).

The pertinent provisions of the statute are:

Sec. 1 declares the public policy of the State as to the effect of heavy motor trucks on the construction, maintenance and safety of use of the highways.

NOTE.—For the convenience of the Court, counsel for the original and intervening defendants, appellants, have incorporated in their separate briefs identical statements of the case, legislative and judicial history, and summary of the evidence.

Sec. 4 provides that "No person shall operate on any highway any motor truck or semi-trailer truck whose gross weight, including load, shall exceed 20,000 pounds;" which should be read in connection with the definition in Sec. 2 reading: " 'Semi-Trailer Motor Trucks' means any motor-propelled truck not operated or driven on fixed rails or tracks, designed to draw, and to support the front end of a semi-trailer. The tractor (or motor-propelled truck), together with the semi-trailer shall be considered one unit, and the words, 'Semi-trailer motor truck' as used in this Act, shall mean and embrace such entire unit * * *'."

Sec. 6 provides that "No person shall operate on any highway any motor truck or semi-trailer motor truck whose total outside width, including any part of body or load, shall exceed 90 inches".

Sec. 7 of the contested Act, relating to the permissible lengths of vehicles was slightly amended by Act No. 746, approved March 10, 1934 (38 St. at Large 1311), adding certain kinds of transportation to the exemptions of the Section, but such amendment is not material in this case.

While the bill of complaint (R. 2, 19) attacked the validity of Sec. 3 of the statute, which prohibits the operation of trailers, and Sec. 7, which imposes a length limit of 35 feet, the attack on these two Sections was abandoned during the suit, that is to say there was no evidence introduced by appellees to sustain their attack on these two sections and only Sec. 4, imposing a gross weight limit of 20,000 pounds, and the provision of Sec. 2, requiring a tractor semi-trailer combination to be considered as a single unit for determining weight, and Sec. 6, imposing width limit of 90 inches, were adjudged to be invalid.

Legislative History of Statute.

The Legislature of South Carolina first dealt with the weight and width limit of motor vehicles in 1920. Act No.

602, approved March 10, 1920 (31 Stats. at Large 1072), Appendix III, created the State Highway Department and Sec. 13 thereof, which dealt primarily with the licensing of motor vehicles, based on the manufacturer's weight, contemplated the licensing of trucks "up to and including seven and over (tons)" but "Provided, that no truck larger than a four-ton truck shall be allowed to be used on any highway or public road of this State, unless the person desiring to operate any such truck larger than a four-ton truck shall first make a petition to the authorities in charge of the roads in any county where it is proposed to operate such truck, stating the road or roads proposed to be used" and unless the road authorities consent to the use of such truck on such roads with the approval of the State Highway Engineer.

Act No. 721, approved March 26, 1924 (33 Stats. at Large 1182), Appendix IV, regulated traffic upon the highways of the State. Sec. 1 thereof made it unlawful to operate on any public road of the State, whether such roads are in the State system or not, "any vehicle of four wheels or less, the gross weight of which, including its load, is more than 20,000 pounds, or to operate any vehicle having a greater weight than 15,000 pounds on any one axle, or having a load of over 600 pounds per inch width of wheel concentrated upon the road surface".

Act No. 685, approved March 20, 1930 (36 Stats. at Large 1192), Appendix V, again changed the weight limits of motor vehicles and Sec. 3 thereof provided: "Except as authorized in Sec. 4 hereof, no vehicle, whether operated singly or in combination with other vehicles on the public roads of this State, shall exceed in gross weight twelve and one-half (12½) tons, and the gross weight on no axle of any vehicle or combination of vehicles, having more than two axles, shall exceed five (5) tons. Any vehicle having more than two axles shall be so designed and constructed as to

assure a constant distribution of weight among the axles while such vehicles are in operation, regardless of irregularities in the road surface. No combination of vehicles operated as a unit on the public roads of the State shall have a gross weight exceeding twenty (20) tons: * * *''.

In 1931, there was enacted Act No. 575, approved June 27, 1931 (37 Stats. at Large 1086, Appendix II), which created a commission to investigate motor transportation in the State of South Carolina and required the report of the commission to be made to the 1932 Session of the General Assembly, and to include "full findings of fact, together with recommendations and suggested legislation, preferably in the form of Bills." This commission held exhaustive hearings, with full opportunity to interested parties to present their views. During such hearing, Dr. C. H. Moorefield, then Chief Engineer of the State Highway Department, and distinguished as a highway engineer and builder, appeared and testified. His statement was introduced in evidence in this case and incorporated a statement previously prepared by him as testimony on a similar investigation held by the State Railroad Commission (Exhibits 8, 9 and 10, R. 255-271).

The foregoing recital of legislative history of the statute indicates most clearly the previous experiments the Legislature had made in trying to arrive at a proper weight limit and the deliberate consideration given to the subject for two years preceding the enactment in 1933 of the limitations herein assailed.

The present width limit of 90 inches was imposed by Act No. 602, approved March 10, 1920 (31 Stats. at Large 1072), and has since been continued unchanged.

Judicial History of the Statute.

Before this suit was begun, the same provisions of the statute now assailed were upheld by the South Carolina

Supreme Court in a suit in which the same constitutional objections (including the attack under the Commerce Clause, but not including that based on the Federal Motor Carrier Act, 1935) were raised in the case of *State* v. *John P. Nutt Co.,* 180 S. C. 19; certiorari denied by this Court March 30, 1936, 297 U. S. 724. The opinion in that case, relying on numerous decisions of this Court, fully sustained the statute and also contains a detailed history of successful resistance to the enforcement of the Act by interests opposed to it, indicating a long continued thwarting of the legislative will by injunctive process. Notwithstanding the fact that the motor carriers who are parties plaintiff herein were not parties to any of the actions in the lower State courts mentioned in the opinion in the *John P. Nutt* case, it seems a clear inference from the allegations of the bill in this case that these parties successfully defied the enforcement of the South Carolina Act during this period and even continued to operate in violation thereof after the final determination of the validity of the statute by refusal of this Court to grant certiorari and until the granting of the temporary restraining order herein in November, 1936 (R. 37).

It may be further noted, in connection with the Judicial History of this Statute, that the District Judge herein, who had first heard the motion to dismiss in this case before the application for an interlocutory injunction and the convening of the Three Judge District Court, reached the same conclusion in upholding the statute, both under the Fourteenth Amendment and the Commerce Clause, as did the State Supreme Court (R. 24, 25).

Summary of Complaint.

The suit was commenced by a complaint filed on the 11th day of August, 1936, wherein seven parties, engaged in the transportation of property in interstate commerce, as common or contract carriers by motor truck, and four parties,

engaged in shipping produce or merchandise by motor truck in interstate commerce, joined as plaintiffs (R. 2-3). The prayer asked only a permanent injunction (R. 19).

The defendants (appellants) included the South Carolina State Highway Department and the South Carolina Public Service Commission, both administrative agencies of the State, their officers and employees, various other officers of the State, and police officers, all charged with the duty of enforcing the Act (R. 3-4).

Certain shippers and the Interstate Commerce Commission were permitted to intervene as parties plaintiff (R. 42, 50-54) and certain railroads were permitted to intervene as parties defendants (R. 43, 49, 54). The Interstate Commerce Commission asked to intervene only because of its interest in the enforcement of the Motor Carrier Act, 1935 (R. 43).

The complaint alleged that the weight and width limits of the Act were invalid on the grounds that:

(1) They violate the Fourteenth Amendment of the Constitution of the United States, in that they are unreasonable, arbitrary and capricious and have no real and substantial relation to the object sought to be obtained by the Act (paragraph 6 of complaint, R. 7).

(2) They violate Section 8, Article 1, of the Constitution of the United States, in that they constitute a direct and substantial burden on interstate commerce (paragraph 7 of complaint, R. 8).

(3) They are so arbitrary and unreasonable that they defeat the useful purposes for which Federal Aid (Secs. 1 to 56, Title 23, U. S. C.) has been granted, i. e., the bettering of the highway system of the United States and the promotion of the national defense (paragraph 8 of complaint, R. 8).

(4) The Motor Carrier Act, 1935 (Sec. 301 to 327, Title 49, U. S. C.), (a) has entirely superseded the South Carolina statute, and (b) renders the South Carolina statute a direct and substantial burden on and interference with interstate commerce, in violation of the Commerce Clause of the Federal Constitution, in that the enforcement of such statute subverts and defeats the declared purposes of said Motor Carrier Act (paragraph 9 of complaint, R. 8-11).

As a factual basis for the relief asked, the complaint further alleged (R. 8) that the essential service of interstate commerce cannot be performed by the several motor carriers with the use of motor equipment limited to a maximum weight of 20,000 pounds and the effect of such limitations in South Carolina would prevent interstate motor carriers from rendering adequate and efficient transportation service and (R. 15) will substantially increase the cost and time of transportation by plaintiffs and substantially increase the cost of transportation to the public and affect the price of goods moving in interstate commerce. There were further allegations that if the limitations of the statute were enforced, plaintiffs will be irreparably damaged and their business impaired or ruined (R. 12, 16, 17).

Rulings Below and Final Decree.

Before the convening of the Statutory Three Judge Court, the District Judge had granted Appellants' motion to dismiss complaint as to Paragraphs 4, 5, 6, 7 and 8 thereof, Paragraph 7 having alleged that the statute violated the Commerce Clause, but refused the motion as to Paragraph 9 of the complaint which related to the Motor Carrier Act, 1935 (Opinion and Orders, R. 22-32).

Appellants filed their answer putting in issue the material allegations of the complaint (R. 38) and appellees (plaintiffs) thereupon moved for interlocutory injunction pending final hearing (R. 32, 33). This was presented to a

single Judge who, after hearing, ordered temporary restraining order to issue to remain in effect until the application for interlocutory injunction could be decided by a three-judge court (R. 34-38). The District Judge convened the Three Judge Court pursuant to statute, before which all subsequent proceedings were had (R. 42). Appellants again moved to dismiss the complaint (R. 44) which motion, after argument, was overruled (R. 97).

The Court ruled that it would reconsider all of the questions heretofore determined by the District Judge and render decision on the complaint as filed (R. 97) and further ruled as to the scope of the hearing (R. 98): "In other words, we will pass upon the question as to whether the Act constitutes an unreasonable burden upon interstate commerce, and we are of the opinion that testimony should be addressed to that question and that question alone, and we see no reason why any great volume of testimony need be taken, or we see no reason why the taking of testimony should consume very much time."

It was thereupon agreed in open court that the hearing should be both final and interlocutory and a final decree should be rendered upon the hearing (R. 99). The Court found and held in its opinion on the final decree that the South Carolina statute did not violate the Due Process or Equal Protection clauses of the Fourteenth Amendment (Fourth conclusion of Law, R. 84) and held that these questions were sufficiently dealt with in the *Nutt Company* case, *supra* (R. 57); and further held that Congress had not assumed to control the size and weight of motor vehicles by the enactment of the Motor Carrier Act, 1935 (Third conclusion of law, R. 84, and opinion of the Court, R. 57).

The final Decree of the Court (R. 85) adjudged and decreed:

> "(1) That the defendants, their agents and servants, be and they hereby are, restrained and enjoined from

enforcing against the plaintiffs while they are engaged in interstate commerce on the highways of the State of South Carolina numbered 1, 15-A, 17, 21, 25, 29, and 52, or on such portions of *other federal aid highways* as may be of standard concrete or concrete and asphalt construction, any provision of Act No. 259 of the General Assembly of South Carolina limiting the gross weight of trucks on highways to 20,000 pounds, or providing that a tractor semi-trailer combination shall be considered a single unit for the purpose of determining weight and thereby limiting the gross weight of such combination to 20,000 pounds, or limiting the width of (fol. 103) vehicles to 90 inches, if the vehicle does not exceed 96 inches in width.

"(2) That the provisions of this injunctive order shall not extend to bridges on the highways mentioned in the preceding paragraph where such bridges have not been constructed with sufficient strength to support the heavy trucks of modern traffic or are too narrow to accommodate such traffic safely, provided that the State Highway Department shall erect at each end of any such bridge a proper notice of sufficient size and character to give ample warning that the use of the bridge is forbidden by trucks exceeding the weight or width limit, and further provided that the proper authorities shall take the necessary steps to enforce the law against the use of such bridges by such trucks."

Paragraph (3) of the decree provided that the injunction was denied with respect to the other roads and bridges of the State, and by (5) jurisdiction was retained by the Court for the purpose of making any such changes as to paragraphs one or two of the decree as may hereafter appear to be proper.

It will be noted from Paragraph (1) of the decree, that while the complaint asked for an injunction generally against the enforcement of the Act as to interstate commerce, without referring to any particular numbered or

described highways of the State system, the Court below by its decree undertook to select certain specifically numbered Federal aid highways and "such portions of other Federal aid highways as may be of standard concrete or concrete and asphalt construction" as the subjects of its injunctive relief; and the second paragraph of its decree, excluding therefrom weak or narrow bridges, is conditioned on the performance of certain requirements imposed therein by the Court upon the South Carolina Highway Department.

Summary of Evidence.

Most of appellees' testimony was offered to show the effect of the enforcement of the State statutes upon interstate commerce. The appellants offered no testimony on that issue.

The eighteen witnesses offered by appellees on that question testified, in substance, that the weight and size of trucks used by carriers for hire are important in determining rates, and that the limits imposed by the South Carolina statute will greatly increase rates. They mentioned particularly a number of commodities, including fertilizer, household goods and furniture, lumber, flour, cotton, textile products, produce of truck farmers and vegetable growers, and stocks of chain stores. Witnesses for appellees testified that enforcement of the 20,000 pounds weight limitation will increase the cost of transportation of South Carolina produce to markets in other states, thus putting such produce at a disadvantage in competing with similar produce from states having a higher weight limitation and that the cost of operating the truck decreases per unit of commodity carried as the total pay load increases (R. 100-117; 142-158); that truck competition with railroads has tended to keep the level of rail rates down as to cotton shipped into the Port of Charleston (R. 107).

Vegetable growers in South Carolina ship to markets outside of the State by refrigerator trucks and most of such trucks are too large to comply with the South Carolina weight and width limitations; they are mostly owned in other States and used in all States; that rail service for less than carload lots is more expensive and slower than truck service and that the enforcement of the South Carolina law will put the South Carolina vegetable growers at a disadvantage with those of other States (R. 107-112; 152-153).

One of the plaintiffs, a carrier who operates in all of the forty-eight States, admitted that he was making money, and that in States like Texas, Tennessee and Alabama, in which he could not use his big trucks, he had special equipment complying with the State laws (R. 147). Another witness, employed in the Bureau of Motor Carriers, Interstate Commerce Commission, stated that trucks are still operated in the States of Texas, Kentucky and Tennessee (R. 142). Another of appellees' witnesses testified that the enforcement of the Act would cause large cargoes of freight now coming into the Port of Charleston to be diverted to other ports (R. 100-106; 204-205).

Many figures and much data from public records were offered, and testified to, showing the following uncontradicted facts. In South Carolina, there are approximately 60,000 miles of public roads, of which about 6,100 miles comprise the State Highway System. The roads in the State Highway System are classified as: "standard paving," of which there were (as of June 30, 1936) 2,417 miles; bituminous surfacing of which there were 1,724 miles; earth type roads, of which there were 1,141 miles; and unimproved roads, of which there were 666 miles. The classification of "standard paving", includes pavement that is wholly concrete, asphalt pavement on a concrete base, and

asphalt pavement on asphalt base (R. 159). The pavement wholly of concrete amounts to 1,800 to 2,000 (R. 160) miles. About 40 percent. of the concrete pavement has center joints (R. 178). Some of the pavements are 16 feet wide and some 20 feet wide, but most of them are 18 feet wide (R. 117).

The State Highway System has cost approximately One Hundred and Fifteen Million Dollars (R. 173-174), of which Twenty-nine Million, Seven Hundred and Forty-one Thousand Dollars was received from Federal aid (R. 137). Maps were used by both parties showing the particular roads upon which Federal aid was used (Exhibit 7, R. 254A; Exhibit 6, 300B, 300C). On Federal aid projects the cost was borne partly by the State and partly by the Federal Government, except some short sections which were built entirely by Federal funds (R. 158-159). No one road in the State is in its entirety a Federal aid project, that is to say, portions of the road were built by Federal aid, while other portions were built entirely by State funds (R. 191-192). Exhibit 4 (R. 253) shows the total mileage of completed Federal aid projects to be 2,798.7 miles; of this 795.8 miles are of concrete and 193.5 miles of bituminous concrete, the rest of this mileage being of low type roads. Exhibit 11 (R. 271-272) shows that there are 4,322 miles of road in South Carolina embraced within the approved Federal aid system.

Exhibit 14 (R. 273) gives the total registration of all motor vehicles in the State by years, from 1925 to 1936, and Exhibit 13 (R. 272) gives the trucks registered by rated capacity from 1933 to 1936. In 1936, there was a total motor vehicle registration of 253,488. There were 30,497 trucks registered. Of these 2,639 trucks exceeded two tons capacity, of which *only 328 exceeded three tons*

capacity, and of this 328 *only 19 exceeded four tons capacity.* Carriers for hire use two to three tons capacity semi-trailer outfits of which class 522 were registered in 1933 and 2,306 in 1936; and no other type has increased in proportion (R. 229). The number of vehicles used for hire in intrastate and interstate commerce, and registered with the Public Service Commission of the State, totaled 111 operated by common carriers, and 1,202 operated by contract carriers (R. 230-231). The irregular route common carrier is classed as a contract carrier under South Carolina law (R. 231).

The conflicting testimony was directed primarily to the questions as to whether or not the assailed provisions of the State Act bear any relation to conserving the highways, maintenance costs, traffic control, and safety thereon.

On these main issues, the plaintiffs offered four witnesses. Harry Tucker, Professor of Engineering in North Carolina State College, and Director of the Engineering Experiment Station at Raleigh, N. C., testified that the gross weight of a motor vehicle does not enter into the design of a concrete highway, or its equivalent; that gross weight of a vehicle has nothing to do with conserving the highway or the cost of maintaining it. In his opinion, the only test is the wheel load. He did not know much about the highway system of the State, but had made a trip over some of the concrete roads of South Carolina, looked at them, and saw no evidence of undue deterioration and they were well constructed and drained. A map showing the route he traveled on such trip is appendix VII. He testified that it is almost impossible to say what causes a failure of pavement, especially a concrete pavement, there are so many factors entering into it (R. 125). He was informed by the South Carolina Highway Department that two sections of concrete pavement are used on the roads he examined; one, 7½-6-7½ which means 7½ inches thick at

the edges and 6 inches thick in the center; and the other 8-6½-8. He expressed the opinion that the concrete roads that he examined will carry a wheel load of from 8,000 to 8,500 pounds, or an axle load of 16,000 to 18,000 pounds safely. He said: "As to how we determine that, we have methods developed originally by Mr. Clifford Older, by the Bureau of Public Roads, by Mr. Westergard, of the University of Illinois, by which, knowing the thickness of a pavement and the strength of the concrete out of which it is constructed, we can determine the wheel load, and therefore, the axle load, which that pavement will carry." He further testified that there is no cumulative stress caused in a concrete pavement by the three axles of a tractor-semi-trailer combination; the three axles, if carrying the same load, and if at least 40 inches apart, each causes a stress in the pavement independently of the other axle; the three axles do not increase the stress. Concrete road sections with a minimum thickness at the center of six inches are good for an axle load of 16,000 to 18,000 pounds. With a tractor semi-trailer combination with three axles the concrete pavement will support approximately 40,000 pounds gross; the front axle of the tractor would bear 8,000 pounds, the rear axle of the tractor 16,000 pounds, and the rear axle of the semi-trailer 16,000 pounds. If another axle could be added to the vehicle 40 inches apart from any other axle and let it carry 16,000 pounds more, the gross load could be increased to 56,000 pounds without doing any additional damage to the pavement. He said in his opinion the roads he examined could carry that load (R. 126-127).

He further testified that figures for the whole country on accidents are the following: For passenger vehicles one accident including death or injury per 100,000 miles; for busses 2.66 such accidents; for intercity trucking 1.69 accidents; the accident ratio is higher for trucks engaged in local deliveries (R. 127-128).

Mr. Tucker stated that he considered that the concrete roads of South Carolina will carry the same loads as the North Carolina concrete roads. He said that the North Carolina roads (where the weight limitations are higher) are in much worse condition than those over which he traveled in South Carolina, but he does not consider the condition of the roads in North Carolina to be due to the heavy trucks; there are so many things that cause the deterioration of a concrete pavement that it is impossible to say it is due to this cause or that cause in any case. He would say in North Carolina there are sub-grade conditions quite different from the sub-grade conditions in South Carolina for one thing. From his observation the sub-grade conditions in South Carolina are most excellent. In North Carolina frost goes quite deep and that makes quite a difference as to the qualities of a concrete road. There isn't much depth to the frost in South Carolina (R. 129-130).

L. W. Teller, engineer employed by the Bureau of Public Roads, testified as a witness for the Interstate Commerce Commission. For 10 years he has been in charge of the Bureau's research in pavement design. The Bureau conducts research and tests and the results are published monthly in its research journal "Public Roads". He testified that the concrete pavement in South Carolina is of typical design; that the gross load is not a factor in the design of concrete paving, but that the critical factor is the wheel load. He expressed the opinion that the standard pavement roads in the State could safely bear a wheel load of 8,000 pounds, with proper pneumatic tire equipment (R. 133). He had no knowledge of the design of the roads and bridges in this State (R. 134). He further testified that the standard pavement roads were the only roads the strength of which could be determined by formula or test; the other types must be judged by observation and he does not know the weights that should be permitted

on them (R. 134). He would not say that a gross load limitation has no connection with the protection of the road, but did state that the 20,000 pounds limit, prescribed by the State statute, would likely limit the maximum wheel load on any type of vehicle to 8,000 pounds, and a few vehicles, loaded to their capacity, could probably carry a wheel load of 8,000 pounds. About one-third of the load is on the front end and two-thirds on the rear (R. 135).

R. W. Knowles, a transportation engineer for a manufacturer of trucks, testified that the tractor semi-trailer type of truck, used in interstate commerce today, is ordinarily designed to carry about 18,000 pounds per axle, or a little less. He expressed the opinion that gross weight does not in any way protect the highways (R. 119) nor was safety on the highways enhanced by such (R. 121). It was his opinion that 40,000 pound trucks could operate as safely as 20,000 pound trucks (R. 122).

C. B. Carley, a trailer salesman, found that he could not operate trucks to come within the limits of the South Carolina Act (R. 155); that South Carolina is the only State that did not permit a width of 96 inches or greater. The States of Florida and North Carolina have recently changed to conform (R. 155). He also stated that Tennessee, Kentucky, Alabama and Texas do not permit a ten ton pay load (R. 155), and expressed the opinion that the gross weight of 20,000 pounds does not relate to safety at all, and implied that the contrary was true (R. 155).

Appellees offered in evidence a portion of a proposed uniform act regulating traffic on highways, prepared and adopted by the National Conference on Street and Highway Safety, as published by the Bureau of Public Roads of the Department of Agriculture in 1934, prescribing that for motor truck vehicles wheel load *should not exceed* 8,000 or 9,000 pounds, and axle load should not exceed 16,000 or 18,000 pounds, depending upon whether the wheels are

equipped with high pressure or low pressure pneumatic tires (R. 277); and prescribing a width of 96 inches for such vehicles. They also offered in evidence along the same lines, recommendations of certain highway associations and others (R. 275-282).

On these issues, the appellants offered three witnesses: J. S. Williamson, Chief Engineer of the State Highway Department; Clifford Older, who originated the first formula used in the designing of concrete paving; and the statement of C. H. Moorefield (now deceased), Chief Highway Engineer from 1920 to 1935, under whom most of the South Carolina highways were constructed, and who testified in the investigation directed by the Legislature in 1931, before the present statute was enacted. Mr. Williamson testified as follows:

In the State highway system there are 2,417 miles of standard pavement, 1,724 miles of bituminous surface type, 1,141 miles of earth type, and 666 miles unimproved (R. 159). The concrete paving is 75 to 80 percent of the total, or 1,800 to 2,000 miles (R. 160). The bituminous surface type is an earth type road covered with an asphalt wearing surface about ¾ of an inch thick. The bituminous surface, earth type, and unimproved roads are quickly impaired and destroyed by heavy truck traffic (R. 161-162-170). There are sections of bituminous surface, earth type and unimproved roads on all roads throughout the State highway system. On some routes there are more weak places than on others (R. 163, 169, 170). There is no definite knowledge as to which roads are traveled most by heavy trucks (R. 163).

There are weak and narrow bridges in many places throughout the State highway system, one not capable of bearing safely more than two tons, one not more than five tons; and of the 50 miles of bridges in the system, 75% have been designed to carry a load not in excess of ten tons (R. 169, 170, 174). There are several bridges 18 feet wide

and one 15 feet wide (R. 164, 167). Trucks have broken floors on bridges from time to time and have knocked hand rails off very often (R. 181).

The load the concrete roads will bear is very indefinite. It depends on a number of different things. Subgrade conditions are a very big factor. Some concrete pavement in one section may hold up 100,000 pounds. The same identical pavement, as far as construction goes, may break up under a two or three thousand pound load. Those subgrade conditions often occur in short distances of one another on the same road (R. 160). Subgrade conditions are about the same in South Carolina as in North Carolina. There is sand subgrade along the coast, some gumbo sections, sand hills, mountainous sections and clay. Frost is sometimes deep enough to disturb some roads (R. 179).

On standard pavement throughout the State the limit of axle weight should be around 13,000 pounds, but there are roads for which that is too much. Greater axle weights are going over the roads now and some of the pavements are failing. Trucks and buses are one cause for such failure, and also subgrade conditions, floods and a little frost. A 16,000 pound axle load is apt to do some damage; the pavement may stand it for a good while but it is bound to break down earlier than if it had a lighter load (R. 187, 188, 195). Under good subgrade conditions the new pavement may support 18,000 pounds axle load but there are weak subgrade conditions, some in short distances of one another on the same roads. Assuming that 90 per cent of the road has no weak spots, axle loads of 12,000 or 13,000 pounds would be heavy enough (R. 179, 160, 182, 187, 189). Maintenance costs amount to one and three-quarter million dollars per annum, no part of which is contributed by the Federal Government (R. 197). The use of bridges for loads exceeding the weights for which they were designed, does not prove their strength (R. 184), and the same is true as to concrete

roads (R. 182, 197). The damage may show up later. Cities and towns of the State have suffered damage to their streets due to the heavy truck traffic (R. 168, 169, 172). Most of these streets were designed only for passenger vehicle traffic (R. 169). The State departed from building standard concrete roads on account of lack of funds, and went to cheaper construction so that they could get people out of the dust and mud (R. 161). (End of Mr. Williamson's testimony.)

Mr. C. H. Moorefield, Chief Engineer of the South Carolina State Highway System prior to July 15, 1935, (now deceased), recommended to the Legislature in 1931 that the truck weight limitation be lowered.

In 1931, the Legislature authorized a committee to investigate motor transportation, and the report of that committee was admitted in evidence (R. 175-176). On November 10th, 1931, Mr. Moorefield appeared before that committee, presented a prepared statement which he had previously submitted as testimony before the Railroad Commission of South Carolina on February 4th, 1931, Exhibit 8 (R. 255-261), and presented also a prepared statement for the investigating committee, Exhibit 9 (R. 261-265). Exhibit 10 is a part of the report of the investigating committee containing their report of Mr. Moorefield's testimony. He stated that if the highways could be designed for a maximum vehicle load not exceeding four tons, which would take care of the ordinary truck having two tons capacity, the average cost per mile of construction would be reduced by at least $3,000 and probably more. The total number of trucks registered for more than two tons capacity plus all busses is about one per cent of all vehicles registered, while the additional $3,000 per mile of highway construction cost in order to provide for this one per cent amounts to 15 per cent of the average per mile construction cost. This means that the State is expending $18,000,000 to accommodate

3,000 vehicles and combinations of vehicles (R. 256-257). Roads which have a small volume of truck traffic have a much lower maintenance cost than roads where there is a large volume of truck traffic (R. 257). Damage caused roads by vehicles is out of proportion to the weight of the vehicles; that is, a five-ton truck will do more than five times the amount of damage that a one-ton truck will do (R. 258). The large and heavy trucks appear to be involved in proportionately more accidents than ordinary vehicles and interfere to a marked extent with the free use of the highways by other vehicles (R. 258-259); they enhance the problem of traffic out of all proportion to the relative number of such vehicles; that even on our 20 foot pavements the average driver of an automobile hates to meet a bus or a large truck and is conscious of being crowded to one side whenever he passes one (R. 259). He recommended to the Legislature that no vehicle with a load capacity greater than five tons should be permitted to be registered (R. 264). The increasing bus and truck traffic is objectionable to the great majority of highway users and the South Carolina highways are not in shape to bear all of the traffic that would be thrown upon them if legislative action encouraged further even gradual substitution of highway carrier service for rail service.

Clifford Older, of Chicago, consulting engineer, testified for appellants as follows:

He was employed by the Illinois Highway Department as an engineer from 1906 to 1917, and as Chief State Highway Engineer from 1917 to 1924. He conducted a test of concrete pavements, known as the Bates test, and devised the first practical formula for concrete pavement design (R. 232). There is no formula to test the strength of any road except a concrete road (R. 239). It is impossible to tell the strength of concrete pavement merely by looking

at it, even though its thickness and width is known. Concrete pavements of the same thickness vary considerably in bearing power. The soil on which it is laid has a good deal to do with it (R. 233-234). A concrete pavement should not bear weight of more than fifty per cent of the ultimate bearing strength. If the stress is ninety per cent the failure will appear almost immediately. If the load stress is a little over fifty per cent, say fifty-five per cent, the failure will not result for a number of years. Stresses of sixty per cent of the ultimate bearing strength cause the road to break within a comparatively short time (R. 235).

The strength of subgrade varies in different parts of the State and even in the same territory approximately. It varies at short intervals along the particular piece of road (R. 235).

Part of the South Carolina concrete pavement does not have longitudinal joints. Pavements having a center thickness of 6½ inches with no longitudinal joint are the weakest in the State. Nature will put a longitudinal crack in it which will separate during low temperature periods. This leaves an unsupported edge 6½ inches thick exposed to the wheels of traffic. Pavements of this kind are not capable of supporting indefinitely wheel loads in excess of 4,200 pounds or axle loads in excess of 8,400 pounds. Pavements having an 8 inch edge thickness, 7½ inch center thickness, and transverse joints should not bear greater wheel loads than 6,400 pounds or axle loads of 12,800 pounds; that is the actual load supporting capacity of the best type of concrete pavement in the State (R. 237-238).

The maximum axle load of 18,000 pounds permitted in many States is an excessive load. In the State of Illinois he built $100,000,000.00 worth of pavement designed to carry a 16,000 pound axle load, 8,000 pound wheel load. Many of those pavements have gone to pieces under such loads, they have been destroyed by the travel. Some of

those roads so destroyed were of approximately the same construction as the South Carolina roads (R. 238). Some are still in service. The witness stated that the whole time he was with the Illinois Highway Department, solid tires were used on those roads, but he observed that the destructive effect of the loads (on the roads) continued just the same after pneumatic tires came into use and, in his judgment, the use of solid tires, as contrasted with the use of pneumatic tires, had nothing to do with the deterioration of the highways (R. 249-250). That is why he wants to be conservative in estimating the bearing strength of a pavement (R. 238). Bituminous surface and earth type roads should be restricted to the use of the average passenger car or truck of equivalent weight and tire equipment (R. 239-240).

The weight of a vehicle has direct relation to its safety. Even though a heavy truck can stop in the same distance as a light car, if both going at the same speed should strike an object, the damage done by the heavier vehicle will be in proportion to its weight as compared with the light vehicle (R. 240).

The width of a vehicle is a factor in the difficulty of passing it from the rear. Where a vehicle is in front of you it is easier to see ahead past the left edge of that vehicle where it is narrow than where it is wide. The angle of vision ahead is cut off in proportion to the width of the vehicle ahead. Six inches in the width of a truck would make a great difference.

The gross load limitation of 20,000 pounds is decidedly generous for the roads of this State. The gross load limitation has relation to the preservation and protection of the highway. If commercial vehicles have three axles the 20,000 pounds gross weight limitation would put the axle weights down to reasonable limits with respect to the

carrying capacity of the roadways of the State. It is difficult to enforce highway laws. A gross load limitation law is easier to enforce than an axle load limitation. For a part of the time while he was Illinois State Highway Engineer he had the direction of the highway police and both methods of enforcement were tried (R. 244). This witness did not agree with any statement that the main standard highways of South Carolina would carry axle weights of 18,000 pounds (R. 250). He stated: "In my experience as an engineer in the years past, working for the State of Illinois, I have never contemplated that the roads of this country would be subjected to the burdens that are now being imposed on them by heavy trucks" (R. 242-243). (End of Mr. Older's testimony.)

Specifications of Errors.

(With Respect to the Motion to Dismiss.)

1. The District Court erred in denying defendants' motion to dismiss the bill.

2. The District Court should have held, on defendants' motion to dismiss the bill, that the facts alleged in the bill, taken in connection with facts judicially known to the Court, failed to establish that the contested weight and width limitations of the South Carolina statute were unreasonable and did not bear a direct and substantial relation to the preservation of the highways and to the safety of other travelers making a normal use thereof, and should have held that they affected interstate commerce only incidentally, and should have dismissed the bill.

(With Respect to Findings of Fact.)

3. The District Court erred in its finding of fact numbered 17, wherein it found, with reference to the 2417 miles

of standard pavement roads in South Carolina, that "All such pavement is capable of sustaining without injury a wheel load of 8,000 to 9,000 pounds or an axle load of 16,000 to 18,000 pounds, depending upon whether the wheels are equipped with high pressure or low pressure pneumatic tires.", in that such finding is not justified by the evidence.

4. The District Court erred in its finding of fact numbered 18, wherein it found, with reference to the standard paved roads of South Carolina, that they "are capable of carrying the commerce which has been developed by modern truck transportation; that federal highways numbered 1, 15-A, 17, 21, 25, 29 and 52 comprise the great arteries of interstate commerce through the state of South Carolina, are of standard concrete paving as above described, with (fol. 109) the exception of a few short stretches, a few miles in length which are not of sufficient importance to justify the denial of the use of these arteries of commerce for the purpose for which they were constructed.", in that (1) such finding is not justified by the evidence, and (2) there is no substantial or specific evidence to show that the weak sections of roads excepted in this finding are either few in number or only a few miles each in length.

5. The District Court erred in its finding of fact numbered 19, wherein it found, with reference to bridges on the highway system of South Carolina, "that there are a few old bridges on the main arterial highways above mentioned and also on the other roads paved with standard concrete paving which were not designed for carrying trucks of greater weight than 20,000 pounds and a few which are too narrow to permit the use of trucks 96 inches in width, and as to these the provisions of the law cannot be deemed unreasonable; but that, as these bridges are few in number and it would be unreasonable to exclude interstate commerce from the entire highway system on their account, such of

them as are considered by the State Highway Department to be unsafe for use by trucks of greater width than 90 inches or greater weight than 20,000 pounds should be so marked so as to afford ample warning that the use of the bridge is forbidden to trucks of that size and weight.'', in that (1) the evidence fails to establish that the old bridges, not designed for carrying trucks of greater weight than 20,000 pounds and too narrow to permit the use of trucks 96 inches in width, were few in number; and (2) the evidence does not justify the Court in assuming the prerogative of imposing conditions upon which the sovereign State may enforce an admittedly valid statute.

6. The District Court erred in its finding of fact numbered 20, wherein it found ''That the effect on the highways and bridges of the state of South Carolina of a tractor-(fol. 110) semi-trailer combination is not different from the effect produced by two vehicles of equal weight, one following the other; and that the provision requiring that the tractor-semi-trailer combination be considered as one unit for the application of the weight limitation is unreasonable.'', in that such finding is not justified by the evidence.

7. The District Court erred in its finding of fact numbered 21, wherein it found ''That the rigid type highways of the state of South Carolina are typical of the design of the highways of that type in a great majority of the states in the United States today, and that they will permit axle loads of 16,000 to 18,000 pounds to be hauled thereon without damage to said highways. That they have been subjected to the traffic of heavy trucks with gross weights in excess of 20,000 pounds and other vehicles since 1930 and are now being subjected to such traffic and there is no evidence of deterioration thereof as a result of such traffic except in isolated instances due to unusual conditions.'', in that (1) such finding is not justified by the evidence, and (2)

there is no material or definite evidence in the record that such highways have been subjected to the traffic of heavy trucks with gross weights in excess of 20,000 pounds and other vehicles since 1930; and (3) there is a failure of evidence to prove that there was no substantial deterioration of such highways as the result of such excessively heavy traffic.

8. The District Court erred in its finding of fact numbered 22, wherein it found "That gross weight of vehicles is not a factor to be considered in the preservation of concrete highways, but wheel or axle weight; that vehicles engaged in interstate commerce are so designed and the pressure of their weight is so distributed by their wheels and axles that heavy gross loads can be carried over concrete roads without damage to the concrete surface; and that a gross weight limitation of 20,000 pounds is unreasonable as a means of preserving the highways", in that (fol. 111) (1) such finding is not justified by the evidence, and (2) a gross weight limit is reasonable and easy of enforcement.

9. The District Court erred in its finding of fact numbered 23, wherein it found "That the gross load limitation has no reasonable relationship to the safety of the public using the highways; that the modern type vehicles engaged in interstate commerce are safer on the highways than the overloaded light trucks which would result from enforcement of the gross load limitations, because they make possible a better distribution of weight and have better braking equipment", in that (1) such finding is not justified by the evidence, and (2) the Court wrongfully assumes, as a premise of its finding, that light trucks will be overloaded in violation of the law.

10. The District Court erred in its finding of fact numbered 24, wherein it found "That the width limitation of

90 inches is unreasonable when applied to the standard concrete highways of the State and the arteries of interstate commerce heretofore mentioned, in view of the fact that all other States in the Union permit a width of 96 inches, this is the standard width of trucks engaged in interstate commerce, and the enforcement of the 90 inch limitation would exclude from the highways a large portion of the equipment now used in interstate commerce without material advantage to the safety or preservation of the highways", in that the finding is not justified by the evidence.

11. The District Court erred in its finding of fact numbered 26, wherein it found that the weight and width limits imposed by the statute "* * * are unreasonable restrictions when applied to the highways heretofore mentioned which constitute the great arteries of interstate commerce of the state and the other standard concrete highways constituting a part of the state highway system; and that as applied to said highways they constitute an unreasonable restriction and burden on interstate commerce; * * *", in that such finding is not justified by the evidence.

(fol. 112) 12. The District Court erred in its finding of fact numbered 27, wherein it found "That the enforcement of the said provisions of the act against the plaintiffs while they are engaged in interstate commerce would in large measure destroy their interstate business, would subject them to ruinous penalties if they should attempt to carry on said business, and would otherwise inflict upon them great and irreparable injury", in that such finding is not justified by the evidence.

(With Respect to Findings of Fact in Opinion.)

13. The District Court erred in finding as a fact in its Opinion (typed page 13), with reference to the effect of heavy traffic on the streets of towns and cities of the State,

that "There is no showing, however, that there has been substantial damage to any streets as a result of the heavy traffic which has been passing over them for the past five years, and no reasonable ground to apprehend such damage in the future", in that (1) such finding is not justified by the evidence, (2) there is no substantial or definite evidence negativing substantial damage to such streets, and (3) the Court shifts the burden of proof from plaintiffs to defendants.

14. The District Court erred in finding as a fact in its Opinion (typed page 21) "Here we have a connected system of standard highways of the finest character; and there is no reasonable relation between the limitations complained of and the preservation of safety of such highways. In the light of experience and of scientific knowledge, there is no ground for reasonable difference of opinion as to the gross load limitation of 20,000 pounds not being necessary for the protection of such roads themselves, and there is even less justification for the requirement that the tractor-semi-trailer combination be counted one unit for the purpose of computing gross load. So far as safety is concerned, the evidence shows clearly that there is less danger to traffic from the standard trucks of interstate com-(fol. 113)merce than from smaller trucks carrying a load for which they are not designed; and certainly there is not enough advantage in a 90 over a 96 inch width to justify the exclusion from an 18 or 20 foot highway of trucks of a width permitted by all other states of the Union", in that (1) such finding is not justified by the evidence, and (2) is contrary to the light of experience and scientific knowledge in such respect; and (3) the Court assumes that smaller trucks will be overloaded in violation of law.

(With Respect to Facts that Should Have Been Found.)

15. The District Court should have found as a fact that the contested weight and width limitations of the South Carolina statute were reasonable and bore a direct and substantial relation to the preservation of the highways and to the safety of other travelers making a normal use thereof, and that they affected interstate commerce only incidentally.

16. The District Court should have found as a fact that there was a substantial and material difference of opinion and judgment on the factual question whether the contested weight and width limitations of the South Carolina statute were reasonable and bore a direct and substantial relation to the preservation of the highways and the safety of other travelers making a normal use thereof, and affected interstate commerce only incidentally.

17. The District Court should have found as a fact that the contested weight and width limitations of the South Carolina statute were not an unreasonable burden on interstate commerce, and affected it only incidentally.

18. The District Court should have found as a fact that the highway system of South Carolina was constructed by the State, as its own property, with its own funds, excepting only those obtained from federal aid, and was intended, designed and constructed only for passenger automobiles and light traffic in trucks, and that the enormous increase in heavy truck traffic, which has since developed, and the use of the highways for substantial and heavy traffic in (fol. 114) heavy trucks, has and will materially damage them.

(With Respect to Conclusions of Law.)

19. The District Court erred in its conclusion of law numbered 1, that the weight and width limitations of the

South Carolina statute are an unreasonable burden on interstate commerce when applied to trucks operating on the designated and standard concrete highways of South Carolina, in that the evidence and facts judicially known show such limitations to be a valid exercise of the police power of the State as to such designated and standard concrete highways, and that they affect interstate commerce only incidentally.

20. The District Court erred in its conclusion of law numbered 5, to the effect that plaintiffs are entitled to injunctive relief restraining defendants from enforcing the weight and width limitations of the statute while plaintiffs are engaged in interstate commerce upon the designated highways and standard concrete highways of South Carolina, in that (1) the evidence and facts judicially known show such limitations to be a valid exercise of the police power of the State as to such designated and standard concrete highways, affecting interstate commerce only incidentally, and (2) the Court should have limited the injunctive relief to trucks not exceeding the weight limits which the Court itself found to be reasonable and proper maximum weight limits.

21. The District Court should have concluded that the contested weight and width limitations of the South Carolina statute were a valid exercise of the police power of South Carolina and not an unreasonable burden on interstate commerce as to plaintiffs.

22. The District Court having concluded (conclusion of law numbered 4) that the weight and width limitations of the South Carolina statute are not violative of the due (fol. 115) process and equal protection clauses of the Fourteenth Amendment, erred in concluding (conclusion of law numbered 1) that the same limitations, in the same circumstances, are violative of the commerce clause of the Fed-

eral Constitution, in that the latter conclusion is repugnant to and inconsistent with the former.

23. In its consideration of the evidence and facts within judicial knowledge, the District Court throughout the case misapplied the rule that plaintiffs bore the burden of proving that the contested weight and width limitations of the South Carolina statute were unreasonable and arbitrary and had no direct or substantial relation to the preservation of the highways or the safety of others making a normal use thereof, and cast upon the defendants the burden of proving the negative of such propositions.

(With Respect to Decree.)

24. The District Court erred in enjoining defendants (Decree, Section 1) from enforcing against plaintiffs while engaged in interstate commerce on the highways of the State of South Carolina numbered 1, 15-A, 17, 21, 25, 29 and 52, or on such portions of other federal aid highways as may be of standard concrete or concrete and asphalt construction, the contested weight and width limitations of the South Carolina statute, in that they are a valid exercise of the police power of South Carolina, affecting interstate commerce only incidentally, and are not an unreasonable burden on such commerce.

25. The District Court erred in enjoining defendants (Decree, section 1) from enforcing against plaintiffs while engaged in interstate commerce on the highways of the State of South Carolina numbered 1, 15-A, 17, 21, 25, 29 and 52, or on such portions of other Federal aid highways as may be of standard concrete or concrete and asphalt construction, the contested weight and width limitations of the South Carolina statute, without limiting the protection of the injunction to trucks with a wheel load not exceeding (fol. 116) 8,000 to 9,000 pounds, or an axle load not

exceeding 16,000 to 18,000 pounds, depending upon whether the wheels are equipped with high pressure or low pressure pneumatic tires, in accordance with its finding of fact numbered 17.

26. The District Court, having found as a fact in its Opinion (typed page 12), with reference to the development of modern transportation units, that " * * * with this modern equipment it is possible to move a heavily loaded truck over the highway with no greater injury to the modern standard pavement than would result from the movement over it of an ordinary passenger car", erred in not limiting the protection of its injunction to modern equipment, of such a character and having such non-injurious effect on the standard pavement.

27. The District Court erred in substituting its judgment as to the weight and width limits of trucks necessary to preserve and promote safety on highways numbered 1, 15-A, 17, 21, 25, 29 and 52, and on such portions of other Federal aid highways as may be of standard concrete or concrete and asphalt construction, for the judgment of the Legislature of South Carolina in this respect, when the evidence showed a dispute among fairminded men as to necessary and proper weight and width limits, thereby usurping the prerogative of the State of South Carolina.

28. The District Court erred (Decree, section 2) in conditioning the right of the State of South Carolina to enforce its statute (admittedly valid) as to bridges too weak and too narrow, upon the erection of signs at such bridges, and the enforcement of the valid law with reference thereto, thereby usurping the prerogative of the sovereign State of South Carolina.

29. The District Court erred in its Decree (section 1) in that the effect of the injunction granted is that the sover-

eign State of South Carolina must classify the highways of the State Highway System for the purpose of enforcing its valid police regulations, first, as between Federal aid high- (fols. 117-127) ways and non-Federal aid highways; second, as between specified highways extending as units across the State and other highways of the State Highway System; and, third, as between sections of highways paved with standard pavement and other sections of the same highways of different construction.

30. The District Court erred in not holding that the State of South Carolina built its highways with its own money, except for some funds received from Federal aid, that it owns them and has the right to use them, and has the absolute right to fix the limits on weight and width of vehicles which may be operated thereon; and that the District Court was without authority to supplant the judgment of the General Assembly of South Carolina as to the proper weight and width limits of vehicles using such highways.

Summary of Argument.

I.

The District Court should have held, as a matter of law, the statute is a valid exercise of the State's police power and is not subject to judicial restraint.

II.

The evidence of record and facts of which the Court may take judicial notice compel the conclusion that the assailed provisions of the statute constitute a reasonable exercise of the State's reserved police power for the purpose of providing protection for the highways and of promoting public safety and convenience.

1. The weight of the evidence in regard to which there is a conflict does not support the Court's conclusion that

the Act is unreasonable as to the roads subject to the decree.

(a) The weight of the evidence as to the ability of the pavements to bear wheel loads of 8,000 to 9,000 pounds does not support the Court's conclusion in that respect, which was its basis for concluding that the gross load limitation is unreasonable, and the conflict in the evidence was such as to leave a fairly debatable question.

(b) The evidence of record and evidence and facts of which the Court may take judicial notice show a real, direct and practical relationship between the 20,000 pounds weight limitation, as applied to both single units and combinations, and the preservation of concrete pavements in South Carolina, and show such limitation to be proper.

(c) The facility of compliance with a gross load limitation justifies it as a valid measure, preferable to a wheel load limit, since it bears a practical relationship to the protection of the pavement.

(d) An absolute and independent justification of the South Carolina gross load limitation exists in the varying subgrade conditions found.

(e) The provision in Section 2 that a tractor-semitrailer combination shall be considered as one vehicle for the purpose of the 20,000 pounds gross weight limitation, is valid.

(f) The width limitation of ninety inches is valid.

2. The decree was based upon the premise that there is a well connected system of concrete roads in South Carolina and the record does not show that such well connected system exists.

3. The statute is reasonable and necessary as a means of protecting all of the highways and bridges in the State and as a means of promoting safety in their use and the Court erred in holding it unreasonable because it had concluded that it was unreasonable as applied to vehicles on a limited portion of the State's highways.
4. Crediting appellees' evidence with all the effect which may properly be attributed to it, the reasonableness of the statute remains a fairly debatable question which should have been left to the Legislature.

III.

The Court's conclusions as to the invalidity of the statute are erroneous because based upon improper tests of reasonableness.

IV.

The District Court had no power to classify the roads and bridges or to rewrite the width limit as those are legislative functions; and lacking such power the Court was required under the evidence and applicable law to hold the entire statute valid as to all roads and bridges.

ARGUMENT.

I.

The District Court should have held, as a matter of law, the statute is a valid exercise of the State's police power and is not subject to judicial restraint. (Assignment of Errors Nos. 1, 2, 19, 24, 30).

The nature of the statute is such as to clearly show that it was enacted as a police measure to preserve the highways and to promote safety in their use. The declaration of policy set forth in Section 1 (Appendix 1, p. 146) ex-

pressly states the legislative intent in that respect. Such action provides:

> "SECTION 1. *Public Policy.*—Be it enacted by the General Assembly of the State of South Carolina: It is hereby declared to be the public policy of this State that heavy motor trucks, alone or in combination with other trucks, increase the cost of highway construction and maintenance, interfere with and limit the use of the highways for normal traffic thereon, and endanger the safety and lives of the traveling public, and that the regulations embodied in this Act are necessary to achieve economy in highway costs, and to permit the highways to be used freely and safely by the traveling public."

It is well settled that if there is a real, substantial, or even reasonably conceivable relationship between the statute, as a means, and a legitimate end sought to be attained by its effect, the statute is a reasonable and valid exercise of the State's police power. The statute in question shows on its face that there is not only a real and substantial but an *obvious* relationship between the gross weight and width limitations of motor vehicles and the damage they do to public highways and the danger and inconvenience to those who use them. The assailed limitations are such as to show on their face, under controlling decisions of this Court, that they are a reasonable exercise of the State's admitted police power. The lower Court should have sustained the statute without hearing appellees' evidence and, failing that, should have dismissed appellees' bill at the conclusion of their evidence as none of it was sufficient to distinguish this case from those previously decided by this Court.

Decisions of this Court have clearly established the principles which are applicable and controlling in the instant case.

Morris v. *Duby,* 274 U. S. 135;
Sproles v. *Binford,* 286 U. S. 374;
Stephenson v. *Binford,* 287 U. S. 251;
N. Y., N. H. & H. R. Co. v. *New York,* 165 U. S. 628;
Bradley v. *Public Utilities Commission,* 289 U. S. 92;
Silz v. *Hesterberg,* 211 U. S. 31;
Hudson County Water Co. v. *McCarter,* 209 U. S. 349;
Geer v. *Connecticut,* 161 U. S. 519.

The District Court, while realizing to some extent the importance of *Morris* v. *Duby* and *Sproles* v. *Binford* (R. 75), finally failed to understand their true meaning. The District Court clearly did not comprehend that the facts and conditions present in those cases, and the contentions made by the plaintiffs, were substantially the same as here.

In *Sproles* v. *Binford, supra* (286 U. S. 374), a Texas law fixed a seven thousand pound net load limitation. The opinion in that case answers every claim made by appellees here. See especially pp. 388, 390, 394. Furthermore we have examined the record and briefs filed here in that case. The plaintiffs' evidence there was precisely similar to appellees' here, and was the following: (1) That the Texas seven thousand pounds net load limitation law repealed a previous law which had permitted a thirty thousand pounds gross load provided the axle load did not exceed sixteen thousand pounds. (2) Several engineers, one from the U. S. Bureau of Public Roads, testified that a net load limitation has no relation to highway preservation; that the Texas law is unreasonable and arbitrary in that highway damage can be prevented only by laws prescribing maximum wheel and axle weights; that the repealed law adequately protected the highways and was similar to the laws of most of the other states. The testimony of Thomas H. MacDonald, Chief of the United States Bureau of Public Roads, before the Interstate Commerce

Commission, shown in the Record in the instant case, p. 281, was also introduced in the *Sproles* case. All of the expert engineering evidence introduced by appellees in the instant case was duplicated in the *Sproles* case, but in the *Sproles* case more engineers testified and the evidence went further than in the present case. (3) That the enforcement of the Texas law will cause great loss to motor vehicle carriers and shippers. The District Court in Texas found that the carriers who had operated in interstate commerce profitably under the old law could not operate their vehicles under the seven thousand pounds net load limitation except at a loss; that trucks usable in neighboring states could not be used in Texas, necessitating transfer of the cargo to smaller trucks at the border.

In response to these claims of plaintiffs in the *Sproles* case this Court said (pp. 388-390):

> "Limitations of size and weight are manifestly subjects within the broad range of legislative discretion. To make scientific precision a criterion of constitutional power would be to subject the State to an intolerable supervision hostile to the basic principles of our Government and wholly beyond the protection which the general clause of the 14th Amendment was intended to secure. Ohio Oil Co. *v.* Conway, 281 U. S. 146, 159. When the subject lies within the police power of the State, debatable questions as to reasonableness are not for the Courts but for the legislature, which is entitled to form its own judgment, and its action within its range of discretion cannot be set aside because compliance is burdensome."
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> * * * * * * *
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> "The objection to the prescribed limitation as repugnant to the commerce clause is also without merit. The Court, in Morris *v.* Duby, supra (274 U. S. 143), answered a similar objection to the limitation of weight by the following statement, which is applicable here:

> 'An examination of the acts of Congress discloses no provision, express or implied, by which there is withheld from the State its ordinary police power to conserve the highways in the interest of the public and to prescribe such reasonable regulations for their use as may be wise to prevent injury and damage to them. In the absence of national legislation especially covering the subject of interstate commerce, the State may rightly prescribe uniform regulations adapted to promote safety upon its highways and the conservation of their use, applicable alike to vehicles moving in interstate commerce and those of its own citizens.' In the instant case there is no discrimination against interstate commerce and the regulations adopted by the State, assuming them to be otherwise valid, fall within the established principle that in matters admitting of diversity of treatment, according to the special requirements of local conditions, the States may act within their respective jurisdictions until Congress sees fit to act. Minnesota Rate Cases (Simpson *v.* Shepard, 230 U. S. 352, 399, 400). As this principle maintains essential local authority to meet local needs, it follows that one State cannot establish standards which would derogate from the equal power of other States to make regulations of their own.''

Particular attention is called to the fact that *Morris* v. *Duby* was decided on motion to dismiss, that no evidence was submitted and that the conclusions of this Court were based upon the face of the order of the Oregon Highway Commission. In both *Morris* v. *Duby* and *Sproles* v. *Binford* the gross weight of vehicles and combinations was limited to an amount *less* than that permitted by the statute in this case. Interstate commerce was involved which was carried on over Federal Aid roads.

The case of *N. Y., N. H. & H. R. Co.* v. *New York, supra,* is persuasive on the immediate point under discussion. There a New York statute prescribed the manner in which railroad passenger cars used within New York, both in intrastate and

interstate commerce, should be heated. In that case the Court said:

> "The statute in question had for its object to protect all persons traveling in the State of New York on passenger cars moved by the agency of steam against the perils attending a particular mode of heating such cars. There may be reason to doubt the efficacy of regulations of that kind. But that was a matter for the State to determine. We know *from the face of the statute* that it has a real, substantial relation to an object as to which the State is competent to legislate, namely, the personal security of those who are passengers on cars used within its limits." (Italics ours.)

In *Bradley* v. *Public Utilities Commission,* 289 U. S. 92. The Court held a State had power to bar an interstate motor vehicle carrier from the use of a certain highway to avoid traffic congestion. While the opinion states that the motor carrier had failed to show that no other route was open to him, a careful reading of the Court's opinion makes it plain that the decision did not turn on that point; what the Court did was to broadly sustain the power of a State over interstate commerce in the interest of highway safety. The Court distinguished cases in which it had held invalid State laws intended as regulations of the business of those using in interstate commerce the highways and made clear the distinction between such commercial regulation of interstate commerce and regulation by a State in the interest of highway safety. The Court said:

> "In the case at bar, the purpose of denial was to promote safety; and the test employed was the congestion of the highway. *The effect of the denial upon interstate commerce was merely an incident.*" (Italics supplied.)

Other cases not involving highway conservation laws directly support the foregoing cases in principle. In *Silz* v. *Hesterberg, supra* (211 U. S. 31), a law forbade the posses-

sion of game birds during the closed season in New York, whether killed within the state of New York or elsewhere. The defendant was convicted of possessing game birds killed in Russia during the open season there and imported to New York during the New York open season, but retained by him during the closed season in New York. It was admitted that the imported birds were readily distinguishable both while feathered and otherwise from any game birds native to New York. This Court nevertheless upheld the New York law on the principle, applicable here, that in the *safe-guarding of the State's property* the State legislature is the *sole judge of the necessity or expediency of the means adopted,* assuming such means to have *any relation whatosever to the preservation of game in the State.* The Court said:

> "It is contended, in this connection, that the protection of the game of the state does not require that a penalty be imposed for the possession out of season of imported game of the kind held by the relator. It is insisted that a method of inspection can be established which will distinguish the imported game from that of the domestic variety, and prevent confusion in its handling and selling. That such game can be distinguished from domestic game has been disclosed in the record in this case, and it may be that such inspection laws would be all that would be required for the protection of domestic game. But, subject to constitutional limitations, the legislature of the state is authorized to pass measures for the protection of the people of the state in the exercise of the police power, and is itself the judge of the necessity or expediency of the means adopted. In order to protect local game during the closed season it has been found expedient to make possession of all such game during that time, whether taken within or without the state, a misdemeanor."

See also *Hudson County Water Co.* v. *McCarter,* 209 U. S. 349, *Geer* v. *Connecticut,* 161 U. S. 519.

The Court's particular attention is called to the case of *State ex rel. Daniel* v. *John P. Nutt Co.,* 180 S. C. 19, 185 S. E. 25, certiorari denied 297 U. S. 724. In the *Nutt* case the statute here involved was assailed as violative of the due process and equal protection clauses of both the State and Federal Constitutions and the Commerce Clause of the latter. The South Carolina Supreme Court, without hearing evidence on the question of reasonableness said at page 29 of its opinion:

> "That there is a direct relation between the weight and size of motor vehicles and the consequent damage to the highways resulting from their use, and the consequent danger to others from their operation, is no longer open to controversy, and reasonable regulations in this respect are within the police power and entirely within the legislative domain.
>
> "The Court here judicially knows that the facts exist, bringing the legislative power into play."

The lower court in this case expressly agreed with the State Supreme Court in its conclusion that the statute does not violate the 14th Amendment of the Federal Constitution. From this conclusion the appellees did not cross appeal. This Court in the *Sproles* case concluded that the Act did not violate the 14th Amendment. The State Supreme Court, in the *Nutt* case, after concluding that these regulations of size and weight did not violate the 14th Amendment, said:

> "It is recognized that the commerce clause of the Federal Constitution goes merely to the extent of inhibiting such regulations as result in discrimination against motor vehicles used in interstate commerce, and does not restrict the state in the exercise of its police power in this respect, so long as the statute applies equally to all."

This is in accordance with the decisions of this Court in the case of *Hendrick* v. *Maryland,* 235 U. S. 610, 622, *Sprout*

v. *South Bend,* 277 U. S. 163, 169, and *Continental Baking Company* v. *Woodring,* 286 U. S. 352, 365.

In *Hendrick* v. *Maryland, supra,* this Court said:

> "In the absence of national legislation covering the subject a state may rightfully prescribe *uniform* regulations necessary for public safety and order in respect to the operation upon its highways of all motor vehicles —those moving in interstate commerce as well as others." (Italics supplied.)

In *Sprout* v. *South Bend, supra,* this Court said:

> "In the absence of federal legislation covering the subject the state may impose, even upon vehicles using the highways exclusively in interstate commerce, *nondiscriminatory* regulations for the purpose of insuring the public safety and convenience." (Italics supplied.)

In *Continental Baking Company* v. *Woodring, supra,* this Court said:

> "Regulations to that end are valid as to intrastate traffic, and *where there is no discrimination* against the interstate commerce which may affect it do not impose an undue burden upon that commerce." (Italics supplied.)

This Court, in the *Sproles* case, after reaching the conclusion that the act in question did not violate the 14th Amendment, concluded therefrom that the Act did not violate the Commerce Clause conditioned however, on two separate provisos (1) That no Congressional legislation has superseded the State's power and (2) that there is no discrimination against interstate commerce.

In the *Sproles* case the Court held that in the absence of the above provisos the *nature of the regulations,* which were precisely of the same nature as those involved here, were such as pertain to "matters admitting of diversity of treat-

ment, according to the special requirements of local conditions," therefore leaving the power in the respective States to "act within their respective jurisdictions until Congress sees fit to act."

Concerning the first of the above provisos, in the *Duby* case, this Court predicated its decision upon the absence of "national legislation especially covering the subject of interstate commerce." This language was quoted by the Court in the *Sproles* case for the same purpose. Manifestly the Court, in using such language, in both cases had reference to the fact that there was no national legislation covering the *size and weight* of motor vehicles used in interstate commerce. It had reference to the well understood rule of supersession. For all of the reasons assigned by the lower Court in its opinion (R. 57 to 64, inc.) in support of its conclusion to that effect (Conclusion of Law No. 3) (R. 84) we submit there has been no supersession by the Congress in its enactment of the Motor Carrier Act, 1935, of any of the State's power in this respect. No such supersession occurred by the enactment of the Federal Highway Act as it was passed before either the *Duby* or the *Sproles* cases. It is a well established principle that where there is a partial occupancy of a field by the Congress and where there is no direct conflict between the Federal and the State legislation both may stand, that in order to bring about supersession the Congressional action must be upon the precise subject matter; and that in the absence of supersession Federal legislation cannot have the *slightest effect* on the State power.

Carey v. *South Dakota,* 250 U. S. 118;

Mintz v. *Baldwin,* 289 U. S. 346;

A. T. & S. F. R. Co. v. *Railroad Commission,* 283 U. S. 380;

Townsend v. *Yeomans,* No. 781, decided May 24, 1937, 81 L. Ed. (Adv.) 840, 847.

Concerning the second proviso, little need be said about the matter of discrimination against interstate commerce in this case. The statute shows on its face that it applies to interstate and intrastate commerce alike. Whether or not the statute operates to prevent equality of competitive opportunity between jobbers and others within the State and those situated in other states is immaterial, for if that constitutes discrimination at all, it is *not discrimination against interstate commerce.*

To sum up, we submit that the statute shows on its face that it is a measure adopted in the exercise of the police power, that from the nature of the limitations, from that which this Court judicially knows, under the rule established in the above cases, there is a direct relation between the statute and the end sought to be accomplished such as to preclude judicial interference; that the subject matter shows on its face that it lies within the field which admits of diversity of treatment according to local circumstances and that there is no discrimination against interstate commerce; and that as a matter of law there has been no supersession of the State's power to act in the premises. We therefore submit that *as a matter of law* the court should have held the statute valid, should have refused to receive appellees' evidence, and, failing that, should have dismissed appellees' bill at the conclusion of their evidence.

II.

The evidence of record and facts of which the Court may take judicial notice compel the conclusion that the assailed provisions of the statute constitute a reasonable exercise of the State's reserved police power for the purpose of providing protection for the highways and of promoting public safety and convenience.

There are approximately 60,000 miles of rural public highways in the State. About 6,100 miles of this have been

specially designated by statute as the State highway system. The State Highway Commission has no authority over any of the remaining mileage in the State, except for streets in towns of less than 2,500 population which form connecting links in the State system. There is also that which is known as the Federal Aid System. Such Federal Aid System constitutes the roads which have been set aside as those upon which Federal funds may be expended for improvement. All of the roads in such Federal Aid System are included within and are a part of the aforesaid State system but not all of the State system is included in said Federal Aid System.

Of the 6,100 miles in the aforesaid State system some 2,417 miles are surfaced with concrete or bituminous concrete. The remainder of the 6,100 miles is surfaced with some other material or not surfaced at all. Of the 2,417 miles surfaced with concrete and bituminous concrete 1,800 to 2,000 miles are of plain concrete and the remaining 417 to 617 miles are constructed with a concrete base covered with bituminous material and are called bituminous concrete.

The decree enjoins the enforcement of the Act as to traffic over highways numbered 1, 15-A, 17, 21, 25, 29, and 52. These numbered roads, for convenience, will hereafter be referred to collectively as the "definite segment." They comprise a total of about 1,134 miles. They are all part of the said State system. They are surfaced partly with concrete, partly with bituminous concrete, partly with bituminous materials on materials other than concrete, partly with macadam or sand-clay and some of such mileage is not surfaced at all. The decree also enjoins the enforcement of the Act against vehicles traveling on "such portions of *other Federal aid highways* as may be of standard concrete or concrete and asphalt construction." Such roads as may be included in the latter provision are not specific-

ally enumerated, and for convenience they will hereafter be referred to as the "indefinite segment." There is no way of definitely determining from the record the aggregate mileage in such indefinite segment. By deduction it is certain the aggregate mileage in *both* segments does not exceed about 2,775 miles and possibly less, dependent upon the explanation of appellees' exhibit 6 as will be hereafter discussed.

Appellees' case is based upon the assertion that the highways of the State are capable of sustaining, without injury or danger, loads greater and vehicles wider than those permitted under the statute. The court found (R. 84) that all provisions of the act are reasonable and not an undue burden on interstate commerce in so far as the 57,225 or more miles of roads not included in either the definite or indefinite segments are concerned, constituting about 96 per cent of all the mileage in the State. This 96 per cent includes some of the mileage in the State system and all of that not in such system.

The appellees did not appeal from any of the lower court's action. There is no conflict in the evidence with reference to the roads not included in the two segments. The only testimony as to the capacity or strength of any of the roads *other* than concrete or bituminous concrete or the effect of truck traffic upon them is that of J. S. Williamson (R. 161, 162, 170) and L. W. Teller (R. 134). Teller testified that as far as he knew the weight that can be permitted on pavement of the bituminous type cannot be determined analytically or by tests. Williamson's testimony to the effect that traffic by vehicles heavier than the ordinary automobile is damaging to types of surfacing other than concrete or bituminous concrete is not controverted.

The only reason given by the court for extending the effect of the injunction to the mileage of pavement within the definite segment which is surfaced with materials other

than concrete or bituminous concrete was that such mileage consisted of "a few short stretches, a few miles in length, which are not of sufficient importance" to justify the denial of their use by heavy vehicles (Finding of fact 18, R. 81). The only conflict in the testimony is with reference to the capacity or strength of concrete and bituminous concrete pavement. The lower court's decree rests entirely on its findings and conclusions with reference to such pavement.

It is to be kept in mind that the validity of the decree is not to be tested by determining whether there is evidence to support the findings *on which the decree is based.* The proper inquiry is whether there is adequate evidence to support the *action of the Legislature.* If there is it makes no difference that there is opposing evidence. This principle has been applied in numerous cases involving the constitutionality of laws enacted, as here, to effectuate State police power. This Court has reviewed the facts and reversed decrees of lower courts which failed to adhere to this rule. *Standard Oil Co.* v. *Marysville,* 279 U. S. 582; *Euclid* v. *Ambler Realty Co.,* 272 U. S. 365.

This test was also applied in *Sproles* v. *Binford, supra* (286 U. S. 374).

This rule applies to statutes assailed as violative of the Commerce Clause. *N. Y., N. H. and H. R. Co.* v. *New York,* 165 U. S. 628, p. 632; *N. C. and St. L. R. Co.* v. *White,* 278 U. S. 456, p. 459; *Silz* v. *Hesterberg,* 211 U. S. 31, p. 39; *McLean* v. *D. and R. G. R. R. Co.,* 203 U. S. 38, p. 54.

In addition to the foregoing, it is well settled that in cases in equity, even in private causes not involving the validity of statutes "findings may be revised at the instance of an appellant, if they are against the weight of the evidence," *Morley Construction Co.* v. *Maryland Casualty Co.,* 300 U. S. 185, 191. See also *United States* v. *Detroit Timber & Lumber Co.,* 200 U. S. 321; *Liberty Oil Co.* v.

Condon National Bank, 260 U. S. 235; *Radio Corporation* v. *Radio Engineering Laboratory,* 293 U. S. 1.

1. *The weight of the evidence in regard to which there is a conflict does not support the court's conclusion that the Act is unreasonable as to the roads subject to the decree.*

> (a) The weight of the evidence as to the ability of the pavements to bear wheel loads of 8,000 to 9,000 pounds does not support the court's conclusion in that respect, which was its basis for concluding that the gross load limitation is unreasonable, and the conflict in the evidence was such as to leave a fairly debatable question (Assignment of Errors Nos. 3, 7, 8, 11, 16 and 23).

The court found the 20,000 pounds gross weight limitation unreasonable as to *concrete and bituminous concrete roads only.* Two findings of fact are stated to sustain this conclusion. They are (1) that wheel or axle weight is the only factor to be considered in the preservation of concrete highways, and, (2) that such pavements can safely bear wheel weights of 8,000 to 9,000 pounds and consequent axle weights of 16,000 to 18,000 pounds (Findings of Fact Nos. 17, 21, and 22, R. 81-83).

The court found the statute reasonable, however, as applied to all of the 57,000 miles of roads in the State not surfaced with concrete or bituminous concrete. The court thus held as against appellees' general prayer for injunction (R. 19) and showing as to the desirability of injunction as to all roads (R. 76-108, 145, 152, 153, 199), that a gross weight limitation statute is not *per se* unreasonable as an exercise of legislative discretion. What the court held was that a gross weight limitation is unreasonable

only when it unduly restricts the use of what the court conceived to be scientifically permissible wheel loads. This follows necessarily from the court's findings, conclusions and decree. Hence the court's conclusion that the 20,000 pounds gross weight limitation is unreasonable as to the concrete roads rests entirely upon its findings that such roads will safely bear wheel loads of 8,000 to 9,000 pounds and, therefore, the 20,000 pounds gross weight limitation is unreasonably restrictive.

It may be objected that the court's conclusion as to the unreasonableness of the gross weight limitation and as to the necessity of applying the wheel load test, in considering reasonableness, refers only to concrete roads, and that for entirely different reasons the court held the gross weight limitation reasonable as to non-concrete roads. Such objection would be without merit. *The only evidence on the point* shows wheel load to be one of the primary factors in relation to the preservation of non-concrete roads (R. 160, 162, 169, 170). The witness Williamson testified, regarding such flexible roads, that heavy traffic on such roads immediately caused failures and ruts would develop in the surfacing and that the wheels of the truck would sink down in there and that the shoulders would push up (R. 161-162). Reflection indicates that excessive wheel load (that is, excessive for the particular type of road) is more damaging to non-concrete than to concrete roads because the latter have beam strength which spreads the load over a larger area. In fact, the greater the beam strength the lesser the importance of wheel load as contrasted with gross load (see R. 170, 171).

To summarize, the court held the gross weight limitation unreasonable as to concrete pavements, only because the statute prevented the use of wheel loads of from 8,000 to 9,000 pounds, and held the statute not per se unreasonable

by concluding that it is reasonable as to roads capable of supporting lesser wheel loads. Therefore, the court's conclusion that the 20,000 pounds gross weight limitation is unreasonable rests directly on its erroneous conclusion that the concrete pavements will safely bear wheel loads of from 8,000 to 9,000 pounds.

If it is pertinent to the issues here we submit that an analysis of the evidence shows *first,* that the appellees failed to sustain the burden of proving that the concrete pavements here involved will safely bear wheel loads of 8,000 to 9,000 pounds, and that the weight of such evidence does not support the court's conclusion in that respect, and, *second,* that the evidence affirmatively shows a conflict on that point which was such as to show a fairly debatable question and to thus preclude judicial determination of the subject. From this we submit that, since the finding as to the ability of pavement to support wheel loads of from 8,000 to 9,000 pounds is the premise, and since the premise fails, the court's finding and conclusion, based on such premise, to the effect that the 20,000 pounds weight limitation is unreasonable as applied to traffic on concrete roads, is erroneous.

The witnesses Harry Tucker and L. W. Teller, both nonresidents of South Carolina, and familiar with the highways about which they testified only by reason of brief observation trips, testified that in their opinion the concrete highways would bear wheel loads of 8,000 to 9,000 pounds and axle loads of 16,000 to 18,000 pounds. They both testified that the gross weight of a motor vehicle had nothing to do with conserving the highway. Mr. Tucker testified that where axles are spaced forty inches apart each causes stress in the pavement independently of the other axles.

We desire to call to the court's attention at this time certain conclusions of the witness Teller published by him

in 1926 which appear to be contradictory of his testimony at this point. See footnote (1) below.[1]

Opposed to this testimony is the testimony of J. S. Williamson, the Chief Engineer of the South Carolina State Highway Commission (R. 158), the testimony of Clifford Older (R. 231), a consulting engineer, and the testimony of Charles H. Moorefield before a committee of the Legislature. Mr. Moorefield (now deceased) was for fifteen years prior to July, 1935, Chief Engineer of the South Carolina State Highway Commission. Mr. Older was referred to by Mr. Tucker as the originator of the Bates Road Test and as a prominent highway engineer. Mr. Older was from 1917 to 1924 Chief Highway Engineer of the State of Illinois, and since 1924 has been in consulting practice. The Bates Road Test conducted by him was one of the first

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[1] The proceedings of the Fifth Annual meeting of the Highway Research Board held at Washington, D. C., December 3 and 4, 1925, and published by the National Research Council in 1926, page 67, contain an article by Mr. Teller on "Stress Measurements in Concrete Pavements." This article states the results of an experiment conducted by him on a concrete test road near Harrisburg, Pa. The test pavement was supposed to have edges eight inches thick and center five inches thick, but the center on actual measurement was found to be nearer six inches thick. It was reinforced with steel at the corners and edges and provided with a tongue and groove type of longitudinal center joint. (South Carolina concrete pavement consists of two types with respect to thicknesses: 7½-6-7½ and 8-6½-8, R. 126; and only about 40 per cent of the concrete pavement has the center joint, and none is reinforced with steel, R. 178). The subgrade of this test pavement ranged from an old stone road to 4 inches of sand or cinders on a clay fill. Test was made of each of the sections of this road by a truck whose gross weight was 26,000 pounds, with a maximum wheel load of 9,000 pounds, which was run at its minimum speed along the outside edge of the pavement and along either side of the longitudinal joint three times only. The article states that this test indicated that the stress in the interior of the slab was not excessive under this 26,000 pounds load, but that "The stresses around the edges of the slab, caused by the 26,000 pound gross load, were sufficient in all sections to produce cracking in the extreme fibers of the concrete, but visible cracks did not appear." Apparently this test by Mr. Teller showed that a stronger pavement than the ordinary South Carolina concrete pavement was damaged by *three* trips over it of a truck with a little bit greater gross weight than that permitted by the law in question here.

practical tests of concrete pavement and as a result of that test he originated the first formula proposed for the *design* of concrete roads.

Mr. Williamson stated (R. 160) that the load concrete roads may safely bear is very indefinite. Subgrade conditions are a very big factor entering into it. Some concrete pavement in one section may hold up one hundred thousand pounds. The same identical pavement, as far as construction goes, may break up under a two or three thousand pound load. These subgrade conditions occur right along in the same territory, often in short distances of one another on the same road. Asked what axle weight he would recommend for the standard concrete pavement, he said an axle weight not exceeding around thirteen thousand pounds, and even with that there were concrete roads that would be too much for (R. 187). A sixteen thousand pound axle load will do some damage and is bound to break down a concrete pavement earlier than if it had a lighter load (R. 195). There have been some failures in concrete pavement. There have been quite a number of corner breaks all over the State. By corner breaks are meant breaks of the outer edge of two head joints. These are joints with expansion strip between them (R. 176). Pavement failures are due to trucks. Subgrade conditions, floods and frost are other causes. Mr. Older testified that the best type of concrete pavement in South Carolina should carry no heavier an axle load than twelve thousand eight hundred pounds. That this might be subject to a variation of 1,000 to 2,000 pounds either way. He testified that pavements without center joint are not capable of supporting indefinitely *axle* loads in excess of 8,000 to 8,400 pounds (R. 237). This testimony is not controverted and Williamson's testimony indicates that from 1,080 to 1,200 miles, or 60 per cent of all the concrete pavement in the State is pavement of this type (R. 178). Older also testified that the maxi-

mum axle load of eighteen thousand pounds prevailing in some States is excessive. He bases this answer on the fact that while he was Chief Engineer of the Illinois State Highway Commission he built $100,000,000.00 worth of pavement having the same thickness approximately as those in South Carolina, and that many of these pavements have failed under a sixteen thousand pound axle load. Many of these pavements have gone to pieces and required replacement. That is why he places the maximum axle load for South Carolina pavements at twelve thousand five hundred pounds (R. 238). He further stated that in his opinion a gross load limitation of twenty thousand pounds had relation to the preservation of the highways. He said, "The gross load limitation for the roads of South Carolina is decidedly generous." It is difficult to enforce axle load limits and is easier to enforce gross load limits (R. 242, 243). Mr. Moorefield recommended to the South Carolina Legislature in 1931 that the then existing maximum weight limitation (12½ tons for one vehicle, and 20 tons for a combination of vehicles operated as a unit, see Act No. 575, South Carolina Statutes of 1931, Appendix II, page 153 hereof) be changed so that the maximum load capacity authorized should be five tons (R. 264). The effect of such a change would be to limit gross loads to 20,000 pounds or less (R. 114-R. 139), and in 1933 the Legislature did adopt the 20,000 gross load limitation here under attack. It should therefore be kept in mind that in 1933 the South Carolina Legislature had before it the recommendation of a highly respected highway engineer whose reputation with the Bureau of Public Roads was "most excellent" (R. 134), and who had, in 1933, been Chief Engineer of the South Carolina State Highway Commission for 13 years (R. 158), that the truck weight limitation should be reduced. This evidence is of greatest weight in considering whether the action of the Legislature was arbitrary and unreasonable.

Mr. Moorefield's recommendation was based upon his observation during his many years of service that heavy trucks damage the highways, and that the damage increases progressively and not proportionately as the weight increases (R. 255-270).

At this point we have the testimony of two non-residents of the State, who made a very cursory examination of a few highways, opposed to the testimony of the Chief Engineer of the State Highway Commission, who is in charge of all of the roads of the State and who is responsible for their building and maintenance, plus the testimony of Mr. Older and statements of Moorefield, who built nearly all the present system.

It is apparent that the District Court was greatly influenced by the recommendations of various unofficial bodies to the effect that so-called modern concrete highways can safely bear wheel loads of 8,000 to 9,000 pounds and axle loads of 16,000 to 18,000 pounds. The court paid particular attention to the recommendations of the American Association of State Highway Officials and the National Conference on Street and Highway Safety (Finding of fact No. 25, R. 83). The latter organization developed a proposed Uniform Act Regulating Traffic on Highways (Opinion, R. 70). The proposed act is known as "Act V" (R. 296, 275). The preface to the proposed act and Section 145 thereof appear in R. 275-277. The entire proposed act was designated for printing by appellees' præcipe (R. 296) but only such preface and Section 145 were printed. It will be observed that the proposed act has been published as a government publication by the Bureau of Public Roads of the Department of Agriculture (R. 275); hence we ask the Court to take judicial notice of Section 146 which is printed as Appendix VI, page 159 hereof. And we now therefore particularly direct the Court's attention to the

explanatory note accompanying Section 146 which is as follows:

> "In view of the varying conditions of traffic, and lack of uniformity in highway construction in the several States, no uniform gross weight limitations are here recommended for general adoption throughout the country. For the protection of bridges, the American Association of State Highway Officials recommends the following formula: W equals 700 (L plus 40) where W equals the gross weight in pounds and L equals the length in feet between the centers of the first and last axles of a vehicle or combination of vehicles."

Therefore the District Court was plainly mistaken in its Finding of Fact No. 25 (R. 83) when it stated that a gross load limit of 20,000 pounds is contrary to the recommendation of the National Conference on Street and Highway Safety. Whatever other recommendations they may favor, the bodies proposing the uniform act expressed the opinion that *there should be left to the several States* the question of gross weight limitation because of the varying conditions prevailing in the different States.

Considering now, however, these recommendations as to wheel and axle weight limitations, and suspending for a moment questions that may occur as to the power of theorists in convention to make recommendations that will in effect bind state legislatures, whatever value or effect anyone might hope to obtain from these unofficial recommendations is utterly nullified by the undisputed facts that many "standard concrete pavements" in North Carolina and Illinois, actually built and intended to support without failure these recommended wheel and axle loads, are in fact going to pieces under them (R. 130, 238).

The Illinois situation, where axle weight of 16,000 pounds and gross weight of 40,000 pounds are allowed, but which limits were challenged by interstate motor carriers as un-

reasonable on the very same theories expressed by the lower Court in this case, was described by a Three-Judge Court in *Werner Transp. Co* v. *Hughes,* 19 Fed. Supp. 425, 429:

> "Even under the present legal weight limits, it was necessary for Illinois to spend the sum of $26,715,118.87 between the years 1925 and 1936 in the maintenance, reconstruction and resurfacing of pavement slabs and shoulders upon the paved road system. During the year 1934 the total cost of pavement replacement throughout the state was approximately $191,000. During the year 1935 such replacement cost rose to $248,000. The records for 1936 have not yet been fully compiled but the cost exceeds that of the year 1935. United States route No. 66, between Joliet and Granite City, is a heavily traveled truck route between Chicago and St. Louis. By actual traffic count, the ratio of truck travel on this route, compared with the general average for the state highway system, was 4.5 to 1 during the year 1932 and 4.2 to 1 during the year 1934. The cost of maintenance of route 66 between the years 1925 and 1936, has been the sum of $1,684,363.68 or an average of $763.53 per mile as against an average maintenance cost of $293.20 for the entire highway system of the state. There are highways in Lake County, Ill., which carry heavy truck travel between Chicago and Milwaukee and those that do not. *Both sets of highways are of similar thicknesses, are subject to the same climatic conditions and have the same type of subgrades and similar drainage. In the case of the pavements carrying but little truck travel, the pavements are enjoying comparatively normal lives with low maintenance cost. In the case of the pavements bearing excessive truck travel, they are rapidly disintegrating. Whenever a particular piece of pavement begins to carry heavy truck travel, immediately the life of the pavement begins to go down and the cost of maintenance begins to go up.*" (Italics supplied.)

The record in this case contains eloquent evidence that matters of the character involved in this proceeding are those which not only admit but require diversity of treatment according to the special requirements of local conditions. The National Conference on Street and Highway Safety frankly recognizes that fact. (Appendix VI, page 159). Professor Tucker testified that there is such a difference between local conditions in North Carolina and South Carolina as to possibly explain why North Carolina pavements are suffering more than the pavements in South Carolina (R. 130). Subgrade conditions are of great importance in building highways and such conditions vary in the different states and in different localities in the same State (R. 130, 160, 179, 234). The carrying capacity of pavement obviously depends upon the materials with which, and the specifications according to which, it is constructed. Pavements of various kinds in the respective states are built according to the direction of a multitude of different local and State officials. Even if the millennium of universal uniformity as to design and construction of pavements could be assumed, which is by no means shown to exist, it is obvious that the subgrade, climatic and traffic conditions vary so greatly in the different localities and communities as to positively require diversity of treatment according to the special requirements of local conditions.

Notwithstanding the recommendations of Mr. Moorefield (R. 264) who built most of the South Carolina highways in his 15 years as Chief Highway Engineer (R 158) and whose professional reputation was "most excellent" (R. 134), regardless of the testimony of Mr. Williamson, the present Chief Engineer, regardless of the testimony of Clifford Older, a nationally acknowledged authority and the originator of the first formula for concrete pavement thickness design (R. 126, 129, 237), regardless of the undisputed

evidence that in Illinois and North Carolina pavements are breaking up under what the District Court called "standard wheel and axle loads", the District Court found that the State of South Carolina is unreasonable in prohibiting such loads upon its highways and therefore that the judgment of the South Carolina Legislature in fixing the twenty thousand pounds gross load limitation is unreasonable.

Independently of all of the foregoing, publications of the United States Government of which this Court can take judicial notice contradict and qualify the testimony of appellees' witnesses Teller and Tucker as to the ability of concrete pavements to bear safely wheel loads of 8,000 to 9,000 pounds and axle loads of 16,000 to 18,000 pounds. We refer to the monthly magazine, "Public Roads", published by the Bureau of Public Roads of the United States Department of Agriculture.[2] In the November, 1935 issue, Vol. 16, No. 9, p. 169, is a report written by Mr. Teller himself entitled "Observed Effects of Variations in Temperature and Moisture on the Size, Shape and Stress Resistance of Concrete Pavement Slabs" which sets out therein results of extensive investigations by the Bureau of Public Roads conducted under his supervision of the subject indicated by the title. As a result of these tests and investigations certain important conclusions were reached, one of which is as follows (p. 196):

> "9. For pavement slabs of the size used in this investigation (10 ft. by 20 ft.) or larger, certain of the stresses arising from restrained temperature warping

[2] We refer to this material on the authority of the general principle of judicial notice and the specific instances in which the same and similar matter has been used by this Court. See *Muller* v. *Oregon*, 208 U. S. 412 at 419; *Interstate Transit, Inc.* v. *Lindsey*, 283 U. S. 183 at 190, where Public Roads and other material is cited though not a part of the record; *Morehead* v. *New York*, 298 U. S. 587 at 626-627; *Helvering* v. *Davis*, No. 910 decided May 24, 1937, 81 L. Ed. (adv.) 804 at 809; and *Carmichael* v. *Southern Coal & Coke Co.*, Nos. 724 and 797 decided May 24, 1937, 81 L. Ed. (adv.) 811 at 820-821.

are equal in importance to those produced by the heaviest of legal wheel loads. The longitudinal tensile stress in the bottom of the pavement, caused by restrained temperature warping, frequently amounts to as much as 350 pounds per square inch at certain periods of the year and the corresponding stress in the transverse direction is approximately 125 pounds per square inch. These stresses are additive to those produced by wheel loads."

In the December, 1935, issue of Public Roads, Vol. 16, No. 10, p. 201, the report on these studies is continued and states (p. 219):

"It is apparent, however, that in pavement slabs as they are designed today the factor of safety against breaking must be very small at times when conditions are such as to produce high (temperature) warping stresses. The relatively frequent transverse cracking in our more heavily traveled concrete pavements is also an indication that the combined stresses in them often exceed the flexural strength of the concrete.

"At first thought one might expect immediate cracking when the combined stresses exceeded the strength of the concrete, and this would probably occur if the high stresses extended completely across the slab. When the critical stress is highly localized, as it appears to be under an isloated load, a single application of an excessive stress may produce no immediate effect. In cases where load stresses are responsible either wholly or in part for the cracking of a pavement, it is but natural to expect the transverse cracking to develop gradually and to continue over a period of years.

"Consider, for example, the case of a heavy wheel load moving longitudinally on the pavement at a time when high warping stresses are present in the slab. Being of the same sense in the midsection of the slab, the stresses combine and may exceed the ultimate flexural strength of the concrete. These tests indicate that the high combined stress will be found to exist only for a very short distance directly under each

> wheel. The remainder of the cross section will not be over-stressed. It is not probable that such a stress condition would cause a full-length transverse crack immediately, but it is reasonable to believe that a great many repetitions of the condition would cause such a crack."

The above reports lead to this: A concrete pavement slab which is designed to carry an 8,000 pound wheel load under normal conditions will be stressed to the point of failure where such load is applied to the slab when it is in a state of high warping stress produced by temperature. Repetitions of such loads (which are of course inevitable on highways) will cause cracks in the slab, leading to failure, expensive maintenance, and eventual replacement. This indicates the need for great caution before a court should set aside, as arbitrary, the action of a State legislature in fixing weight limitations on the advice of the State engineers. This further indicates the wisdom of Mr. Older's "conservatism" (R. 237-238) in stating that the South Carolina concrete pavements should not be subjected to wheel loads exceeding 4,200 to 6,400 pounds (R. 237). It emphasizes that the various organizations that have advocated permissive wheel loads of 8,000 to 9,000 pounds have, as is usual in such cases, devoted themselves entirely to theory, might have been influenced by selfish interest and certainly overlooked the practical facts.

The 1933 Legislature of South Carolina was not dealing in theory but was at grips with the hard, practical problems of financing and building highways. In fixing the 20,000 pounds gross weight limitation as a means of conserving those highways it followed the recommendation of Mr. Moorefield, who had then been building such highways for thirteen years (R. 264). Mr. Moorefield's integrity and high professional standing have never been challenged. The wisdom of the Legislature is now further attested by the

testimony of Mr. Older and of Mr. Williamson, the present Chief Engineer of the State Highway Commission.

The foregoing analysis conclusively shows that if the ability of the concrete pavements in South Carolina to bear wheel loads of 8,000 to 9,000 pounds is an issue, the appellees failed to sustain the burden of proving it; and that there is a great volume of evidence in sharp conflict with the affirmative evidence on the point and in conflict with the court's conclusion as to the ability of such pavements to sustain wheel loads of 8,000 to 9,000 pounds, which evidence cannot properly be disregarded.

Since the appellees failed to sustain the burden of proving that the aforesaid pavements can safely bear axle loads of 16,000 to 18,000 pounds; since there existed the foregoing conflict in such evidence; since the conclusion of the court with reference to the capacity of such pavement was the basis for its finding and conclusion that the 20,000 pounds weight limitation was unreasonable and hence invalid; and since under established law the court had no power in the face of such conflict in the evidence, to set aside the legislative pronouncement, we therefore submit that the court's decree is erroneous so far as it pertains to the weight limitation assailed and that such decree should be reversed.

> b. The evidence of record and evidence and facts of which the court may take judicial notice show a real, direct and practical relationship between the 20,000 pounds weight limitation, as applied to both single units and combinations, and the preservation of concrete pavements in South Carolina, and show such limitation to be proper (Assignments of error Nos. 6, 8, 9, 14, 16, 24).

The court found that there was *no reasonable difference of opinion* as to the gross load limitation of 20,000 pounds

not being necessary for the protection of the concrete roads and that there was even less justification for the requirement that the tractor-semitrailer combination be counted one unit for the purpose of computing gross load (Findings of Fact 22, 26, R. 83, 84, Opinion R. 73, 75). It is evident from a careful study of the record that in reaching this conclusion the court misunderstood much of the evidence which was plainly before it. Appellees proceeded upon the theory, and the court concluded, that only wheel load or axle load are critical factors in pavement strength (Finding of Fact 22, R. 83). They failed to explain the difference between theoretical factors of *design* and practical factors of *limitation.* At no point in the record did the court have the benefit of a plain, simple translation of wheel load into axle load and then into gross load, yet the relationship is clear and was apparently so obvious to the expert witnesses in the case that no simple explanation was made.

The witness Teller testified (R. 135) in regard to the ratio of axle load to gross load of trucks that "we have weighed a good many of them", meaning the U. S. Bureau of Public Roads, that in general "there is from sixty-five to eighty per cent of the load on the rear end", referring to conventional trucks of two axles, and that according to the most recent data with which he was familiar, and the trucks they had been using in their tests, there was about one-third on the front end and about two-thirds on the rear end when a capacity load was on.

Interesting data upon this subject appear in the United States Government publication, "Public Roads" above referred to. In the May, 1935, issue, Vol. 16, No. 3, appears an article entitled "A Study of The Weights and Dimensions of Trucks". It describes a study made jointly by the U. S. Bureau of Public Roads, certain officials and departments of the State of Maryland, and the Johns Hopkins Uni-

versity, to determine, among other things, how the gross loads of motor vehicles are commonly distributed to the various axles. Data was obtained by weighing trucks at two-week intervals from the middle of June to the middle of November in 1934 at roadside "clinics" on two U. S. routes out of Baltimore which presumably carried the interstate traffic referred to generally in this case. At page 42 appears the following:

> "* * * in the case of single vehicles, the weight carried on the rear axle averages approximately three-fourths of the gross load. Vehicles having gross loads less than 10,000 pounds carried an average of only 68 per cent on the rear axle. The gross weight groups above 10,000 pounds all had an average of close to 75 per cent for weight on the rear axle. Included among these vehicles were many partially loaded trucks, and the low average percentage of load on the rear axle is doubtless due to greater proportionate effect of the engine and the tendency to carry partial loading in the forward part of the truck body. * * * In the case of tractor-semitrailer combinations, it may be seen that about 45 per cent of the entire gross weight of the combination is carried on the rear ends of both tractor and semitrailer, leaving about 10 per cent for the front wheels of the tractor."

It is therefore obvious that, when practical facts about automotive engineering are taken into consideration, a 20,000 pound gross load limitation when translated into axle-loads means that for the standard, two-axle trucks in use there is an *automatic* limitation for the heavier axle of from 13,333 pounds to 15,000 pounds. Since an axle is supported by a wheel or dual wheel assembly at each end a 13,333 pound *axle* limit in practical fact results, when the axle is level, in a *wheel* load limit of 6,666 pounds and a 15,000 pound *axle* limit in a 7,500 pound *wheel* limit. In this connection it is significant that the witness Older

testified (R. 237, 238) that the maximum axle limit which should be permitted on the best concrete pavement in the State is 12,500 pounds, and the witness Williamson (R. 187) that, for protection of all the concrete pavement in the State, an axle load limit of not to exceed 13,000 pounds should be maintained. From this very simple analysis it may be seen that there is a direct and real relationship between the 20,000 pound gross load limit and the protection of the concrete pavement so far as two-axle trucks are concerned. If inaccuracy exists the limit is too liberal, but the legislative judgment might properly have been influenced by other considerations such as the number of such heavy units which might operate, the tax revenue they might produce or even the economic arguments urged by appellees.

However, it is urged by appellees that if axles are spaced forty inches or more apart that neither axle contributes to the stress in the slab which is set up by the other. They then argue that, such being the case, axles may be multiplied indefinitely provided no single axle is overloaded and the 40-inch spacing is maintained and no greater damage will occur to the pavement than through the operation of an ordinary two-axle truck. Although appellees abstract statement to that effect, when understood in the light of practical circumstances, means something entirely different, as we explain in our subdivision (d) of this point, even if such allegation were correct there is an absolute justification for the 20,000 pounds gross weight limitation. As is well known the ordinary type vehicle which makes use of more than two axles is the tractor-semitrailer combination. This consists of a motor unit, called a tractor, with motor and cab, supporting, over its rear axle, the forward portion of a semitrailer, which semitrailer is supported at its rear end by a third axle.

The gross load distribution which occurs over the three axles of a tractor-semitrailer combination in practical operation is described in the above mentioned article in "Public Roads" Vol. 16, No. 3. It shows that about 90 per cent of the entire gross weight of the combination rests on the rear axle of the tractor and the rear axle of the semitrailer, that is, about 45 per cent on each of the last two of the three axles, leaving about 10 per cent for the front axle. It also explains that for single vehicles only about 68 per cent of the gross weight is carried on the rear axles of trucks having a gross weight of not over 10,000 pounds, as against an average of 75 per cent for all trucks, showing that for lighter units it is possible to place a greater percentage of the gross load, in fact as much as 3,200 pounds, on the front axle without impairing steering and "maneuverability". It is reasonable to assume that such is the case with the lighter tractor-semitrailer combinations.

It may thus be seen that a gross weight limitation of 20,000 pounds, as applied to such combinations, when considered in the light of practical experience and, recognizing the manner in which trucks are commonly designed and loaded, automatically and by its own terms, means that the second and third axles shall not exceed from 8,500 to 9,000 pounds, since the front axle will carry from 2,000 to 3,000 pounds.

It may then be urged that such a limit is unreasonable and not necessary for the protection of the pavement. But let us scrutinize the evidence from that standpoint.

The witness Williamson testified (R. 178) that about 60 per cent of the concrete pavement has been built without any center joint. This is not controverted. There are 1,800 to 2,000 miles of concrete pavement (R. 160) which means that there are from 1,080 to 1,200 miles of such pave-

ment without such joint. We assume the witness referred to concrete as distinguished from bituminous concrete. If bituminous concrete is included, the point here urged is stronger. Williamson also testified that all pavement built since 1929 or 1930 had been built *with* center joint, so that the 720 to 800 miles of concrete with such joint was all built since that date. The Act in question was passed in 1933, and, although there is no showing as to the pavement built each year, it is fair to assume that considerably in excess of 60 per cent of the concrete pavement then in existence was without such joint.

At this point the testimony of the witness Older is particularly illuminating (R. 237). He testified, in substance, as follows:

> A pavement may or may not have a longitudinal joint running down the center of the road. Williamson's testimony indicated that part of this pavement did not have longitudinal joints. The concrete pavement having no longitudinal joint having a thickness of six and one-half inches at the center and seven and one-half inches at the edges are the weakest pavements of the lot. It is a matter of common observation that if there is not a center longitudinal joint built into the pavement, nature will put a longitudinal crack in it. Now, when this crack comes it will separate a certain amount due to contraction during low temperature periods. Then at the interior portion of the pavement we have an edge that is only six and one-half inches thick that is exposed to the wheels of traffic. The outer edge has been strengthened to perhaps carry a heavier load, but here is an inner edge that is a weak link in those pavements. For those pavements I would be forced to give an opinion of a load that is quite low. In my judgment, those pavements are not capable of supporting indefinitely wheel loads in excess of about 4000 or 4200 pounds.

There is no specific testimony in the record to controvert Older's statement as to the capacity of concrete pavement without center joint. The only testimony which might be claimed to conflict is that of Mr. Tucker (R. 126) that the pavement over which he traveled was in good condition and would bear axle loads of 16,000 to 18,000 pounds, and there is no showing as to whether or not such pavement was built with center joint; that by Mr. Teller which was general in character (R. 133) and to the effect that concrete of the thickness of that prevailing in South Carolina would bear 16,000 to 18,000 pound loads with no discussion of the presence or absence of center joint; and the admission by Mr. Williamson (R. 179) that the new roads built on main highways will support axle loads of 18,000 pounds under good conditions. His admission is later qualified, as will be hereafter explained, but it must be admitted that roads built prior to 1930 are not "new roads" and that he could not have been referring then to the pavements without center joint.

As Mr. Older testified that the wheel load on some 60 per cent of the concrete roads, that is, those without center joint, should be limited to 4000 to 4200 pounds, an understanding of such testimony means an axle load of 8000 to 8400 pounds which, when explained as above, means a gross load for a tractor-semitrailer of just a little less than 20,000 pounds which is provided in the statute.

As we previously observed, the Act was passed on the advice of the then State Highway Engineer, Mr. Charles H. Moorefield. He was undoubtedly aware of the condition of the roads and how they had been constructed. He must have known of the large mileage of concrete in existence in 1933 which was without center joint. He must have known of the need of such joint because he had then been building pavements with such joint for a period of about

four years. It is reasonable to assume that he calculated the capacity of such pavement in the same manner as did Mr. Older and that he was aware of the manner in which truck and trailer loads were commonly distributed, and advised such a limitation as a very practical measure to protect the bridges, the weak concrete pavement without center joint, the bituminous pavement and low type surfacing, the city streets and the highways of the State generally, yet to permit such volume of traffic as would move in conventional two-axle trucks to maintain a rear axle load as nearly consistent with the limits in other States as practical local considerations would permit.

From that which is set forth above, it is readily obvious that the Court either misunderstood or disregarded the testimony which was before it in reaching the conclusion that there was "no reasonable difference" of opinion as to the absence of any relationship between the gross load limit and the protection of the roads, and in the observation that there was "even less justification for the requirement that the tractor-semitrailer combination be counted as one unit for that purpose". A legislative enactment need not be scientifically accurate nor mathematically exact. The Legislature was entitled to make the common sense observation that single trucks commonly operate on two axles, front and rear, that the greater portion of the load is commonly balanced over the rear axle, that from two-thirds to four-fifths of the load is commonly carried on such rear axle, that tractor-semitrailer combinations commonly operate on three axles and that the rear axle of a semitrailer is commonly loaded in about the same manner as the rear axle of its tractor. The Legislature need not spell out the basis of its pronouncements in order to preserve their validity. If the legislative result does substantial justice the manner in which and the basis upon which it achieved that result is immaterial. Highway construction

is not an exact science. Factors for *design* of pavements may or may not be fair or practical factors for their *protection*. The evidence of record and the very nature of the gross weight limitation furnish ample basis for both the conclusion that it is a fair, a necessary and a reasonable measure for highway protection and that there is ample room for, and that there does in fact exist, an actual difference of honest opinion as to its fairness, necessity and reasonableness.

> c. The facility of compliance with a gross load limitation justifies it as a valid measure, preferable to a wheel load limit, since it bears a practical relationship to the protection of the pavement. (Assignments of Error Nos. 8, 9, 14, 16, 24.)

As has been pointed out above there does exist a very practical relationship between the gross load limit here considered and the protection of the South Carolina roads. While we contend that the comparative merits of two valid limitations are not questions for the Court to decide and must be left to the exclusive discretion of the Legislature, we further urge that the facility of compliance with a statute as well as the multiple purpose or purposes for which it is enacted must be taken into consideration in determining its reasonableness. Here the Court finds that a gross weight limitation is reasonable with respect to bridges, although it does find that a 20,000 pounds gross weight limit is unreasonable as applied to "modern bridges" (Finding of Fact 25). When the Legislature passed the Act in question it must be borne in mind that it had many problems to consider. It must protect not only the "modern" concrete roads but also the old ones, with or without center joint, the bituminous roads, those covered with low type surfacing, the local roads, the city streets and the bridges, both old and modern. If the Legislature could lay

down a plain simple limitation which was the *result* of the consideration of the capacity of all of these elements its simplicity and the facility with which it might be complied with, as well as efficiency in enforcement, are all elements for legislative consideration and bear upon the reasonableness of the Act.

It must be conceded that a truck operator knows or can easily ascertain the unladen weight of his equipment. With a flat, gross weight limit it is a simple matter to subtract such unladen weight from the limit permitted to determine the amount he may legally haul. Clearly the weight of the cargo must be determined under any kind of a limitation and, with a gross weight limit applicable to all, a truck operator can readily comply with the law.

If the limit is based on wheel weight how can an operator know that his load will not shift after it is loaded, that the wheels on opposite ends of an axle will remain level and thus evenly divide the axle weight, or that in the case of fluid cargo, such as gasoline and the like, the load may not flow to different axles on the up or down grades?

Contrast the simplicity or practicability of the limit here questioned with that which is urged by appellees, W equals 700 (L plus 40), explained as it may be, then visualize the mathematical gymnastics which must be performed by the average truck operator or the average law enforcement officer to determine whether or not he is violating the law, and the good sense of the legislative judgment is immediately apparent.

> d. An absolute and independent justification of the South Carolina gross load limitation exists in the varying subgrade conditions found (Assignments of Error Nos. 8, 9, 14, 15, 24).

Professor Tucker testified:

> "It is almost impossible to say what causes a failure of a pavement, especially a concrete pavement, there are so many factors entering into it" (R. 125).

Pavement failure is due to a number of causes including trucks, subgrade conditions and frost (R. 125, 130). Concrete roads constructed in as nearly the same manner as possible will vary in strength in different places. The strength of subgrade and foundation varies in different parts of the State and even in the same territory approximately. Sometimes it varies in very short intervals along the same piece of road (R. 235).

All of the witnesses agreed that subgrade conditions are one of the principal causes of pavement failure. Inasmuch as the record contains very little evidence as to the reasons for the importance of subgrade, what faulty subgrade conditions are, and what effects they cause, we at this time resort to information of which this Court can take judicial notice contained in the aforesaid magazine "Public Roads".

No. 3, Volume 10, page 37, May, 1929, contains an article "Interrelationship of Load, Road and Subgrade". The importance of subgrade is shown by the following on page 41 of such article:

> " 'Breakage' due to load occurs on account of low subgrade support. This was clearly brought out in surveys by the highway research board and experiments performed at Arlington. According to the Arlington test data summarized in Table 2, the ultimate resistance of slabs (7 feet square) to the occurrence of breaking differs considerably depending upon whether they are laid on a drained or an undrained subgrade."

Table 2.—Average load capacities of nonreinforced concrete slabs 7 feet square, when laid on clay subgrades drained and undrained. (Impacts applied at corner and edges of slabs, Arlington tests.)

Slab thickness, inches	Mix	Breaking loads [1]	
		Wet subgrade	Drained subgrade
		Pounds	Pounds
4	1:1½:3	[2]	13,650
6	1:1½:3	12,825	[3] 20,000
[4] 6	1:1½:3	10,675	22,225
8	1:1½:3	25,900	42,040
[4] 8	1:1½:3	25,475	38,800
[4] 6	1:3:6	[5]	18,430
6	1:3:6	9,580	[3] 18,300

[1] Unless otherwise noted each value is the average of two tests, one with the load applied at the edge and the other with the load applied at the corner of the slab.

[2] Broke under static load varying between 2,000 and 8,000 pounds.

[3] One edge test.

[4] Covered with bituminous tops.

[5] Six out of eight slabs tested broke under static loads varying between 2,000 and 8,000 pounds, the other two tests, both for edge loading, averaged 10,105 pounds."

The complexity of the problem is shown by the following from page 45:

> "Thus, according to the preceding discussions, pavement behavior may depend upon the character of the subgrade soil material (raw constituents), upon the structure of the soil in its natural state (dense or loose, homogeneous or full of cracks or root holes), upon the soil profile (variation in depth of the different soil zones and the relative occurence of permeable and impermeable strata) upon adjacent topography (through its influence upon the occurrence of surface and un-

derground water), upon climatic conditions (well distributed or intermittent occurrence of rainfall and presence or absence of frost action), or upon any combination of these variables."

A discussion of some of the soils of South Carolina appears at page 48:

"GROUP A-5, SOILS CHARACTERIZED BY POROSITY, DEFORMATION, AND REBOUND.

Similar to those of Group A-4, these subgrades also consist primarily of very fine sands or silts. But in addition, they contain an appreciable percentage of micaceous particles or diatoms, which cause the subgrades of this group to be highly porous, to deform quickly under load and to rebound appreciably upon removal of load." * * *

"The highly micaceous soils occur very frequently in Pennsylvania, Maryland, and North and South Carolina and other states."

A further description of subsoils encountered in South Carolina is contained in Volume 17, No. 11, page 249, January, 1937, of "Public Roads". This article is entitled "Experimental Bituminous Treatment of Sandy Soil Roads" and has to do entirely with South Carolina. With reference to certain South Carolina soils it is stated on page 249:

"A wide variety of bituminous materials and aggregates have been used successfully for such work, and while different types of surfaces have resulted, there has been no special difficulty in providing a satisfactory surface for roads whose bases and subgrades were capable of supporting traffic.

"For those localities where the roads were composed of loosely bound soil, such as sand or mixtures of sand, silt, and clay that were inherently weak, the problem of improvement was more difficult. Such a condition is found in the South Atlantic coastal area in general, and the eastern part of South Carolina in particular.

"An appreciable mileage of the roads in this territory traverses relatively low, swampy areas that offer little opportunity for adequate drainage of the right-of-way because the ground-water level in many places is approximately at the elevation of the ground surface."

And on page 260:

"The most important factor contributing to roughness during most of the life of the road has been the sub-grade, which is extremely variable in composition and, in some locations, is very poorly drained. Settlement occurred in some areas that had appeared stable prior to constructing the bituminous mats. Investigation disclosed that the subgrade in such areas was extremely wet and plastic while material less than a foot outside of the bituminous mat was firm and relatively dry. The mat apparently prevented surface evaporation and permitted the subgrade to acquire and retain sufficient moisture to destroy its stability. Obviously, the composition could not be changed after construction but considerable effort has been expended to provide artificial drainage. The ground-water level in many cases is so high that the maximum benefit derived by the construction of side ditches is to provide a relatively shallow depth on drained base which, because of its composition, is variable in load supporting capacity."

And on page 261:

"As in the case of experiment 1, subgrade and drainage conditions in this experimental section were exceedingly variable. Each section had sandy areas, areas high in clay content, poorly drained areas, and areas fairly well drained."

A further discussion of subgrade, entitled "The Soil Profile and the Subgrade Survey", appears in the September, 1931, issue of Public Roads, Vol. 12, No. 7, p. 181. At pp. 183-184 the following appears:

> "The characteristics of a soil and its value as a subgrade under different conditions are directly reflected in the condition of the road surface. Rigid pavements are affected by inequalities of subgrade support. Nonrigid pavements are chiefly affected by low road supporting power. Studies have shown that the subgrade soil exerts important influence upon the distance between transverse cracks in concrete roads, and that excessive longitudinal cracking develops on definite layers of certain soil types. Other soil characteristics, such as swelling, affinity for water, rebound, etc., are detrimental to concrete before it sets as it is then flexible pavement."

Faulty subgrade conditions not only result in breaking of the pavement slabs on the application of truck loads, but also cause a sinking away of the subgrade underneath the pavement, resulting in a subsiding of the pavement. To fill in subgrade that has subsided, or to strengthen such subgrade, and thereby bring the pavement back to grade, resort is had to the operation known as "mud jacking". Some explanation is given of this in Volume 14, No. 10, page 188, December, 1933, issue of Public Roads, entitled "Laboratory Tests Assist in the Selection of Materials Suitable for Use in Mud Jacking Operations". To carry on this operation a hole is bored through the pavement and a suitable material is pumped through this hole. The following quotations show the nature of the operation as fully as shown in the article:

> "A satisfactory mixture of soil, portland cement, and water for use in raising settled areas of road surfaces by mud jacking (see fig. 1) must be of such a character that it can be readily forced through the mud jack. It must possess qualities which will enable it to spread freely over the subgrade as the separation between the road surface and subgrade increases during the pumping operation, and it must prevent apprecia-

ble settlement of the raised area of pavement after the pumping operation. * * *

"In passing through the pump and hose the mixture is confined to a definite channel of comparatively large size and only the proper combination of pump pressure and fluidity of mixture are required. When the paste reaches the subgrade, however, its flow is not restricted to any particular cross section. It is free to form in layers whose ratios of thickness to area of distribution depend to a very considerable extent on the frictional resistance of the subgrade and the under face of the road slab which bound the shallow openings penetrated by the paste. * * *

"Raised areas of pavement may settle after the pumping ceases as a result of several causes. The weight of the pavement may cause the viscous paste to flow out as soon as the pump stops or the paste may shrink on loss of moisture. The paste or soil mixture must be stable enough to support the pavement and loads produced by traffic immediately after pumping ceases and must resist shrinking upon loss of moisture."

The subjects of subgrade and mud jacking are discussed in *Werner Transportation Co.* v. *Hughes* (D. C. N. D. Ill.) 19 Fed. Supp. 425 at 428, 429, as follows:

"Because of the presence of varied types of soil in Illinois, there is a variance in the supporting power of the subgrade during the seasons of the year. In the case of embankment materials, it is difficult to place them in a state of compaction which is uniform in its supporting power and will prevent settlement of the pavement slab. When the frost leaves the ground, many soils have little supporting power and many change greatly in volume with the addition of a relatively small amount of precipitation. During the periods of freezing weather many soils expand greatly, due to presence of water, and lift the pavement from the subgrade, introducing roughness into the surface,

> resulting in impact stresses under heavy loads, producing pavement destruction. Daily changes in temperature cause the pavement slab to warp, or curl, thus leaving that particular portion of the slab without subgrade support, so that when a vehicle passes across such portion of a slab, the slab must act as a beam to carry the load back to the point where there is support. * * *
>
> "Subgrade conditions are frequently unstable on fills back of bridge abutments and at other locations. Depressions in the subgrade are usually caused by the action of moisture upon unstable soil and a variety of other causes. *Where a weakened subgrade condition exists the pavement slab performs to some extent the functions of a bridge, in which case the total or gross weight imposed upon the slab determines the stress induced upon the material constituting the slab.* (Italics supplied.) If the stress produced by such total weight is in excess of the ultimate strength of the material, rupture will occur and the slab will settle into the affected area. Because of the settlement of slabs, it is necessary to raise them by what is called a mud pumping outfit. Since the year 1931, there has been in Illinois a total of 12,050 depressions so raised, covering a total area of 1,082,775 square yards. However, in numerous locations where such settlements have occurred, the pavements have been so badly broken that they had to be entirely rebuilt."

The relation of all of the foregoing to the subject of the validity of a gross load limitation is plain. It is stated in the above quotation from the Werner Transportation Co. case, "When a weakened subgrade condition exists the pavement slab performs the function of a bridge." This may be reasonably deduced from the evidence in the record. The slab spreads the weight of the vehicle over the subgrade (R. 136). It is the subgrade which supports the load. It is the function of the surfacing merely to act as a roof over the

subgrade and to spread the load over such subgrade (R. 160). Where the subgrade is weak, where the material has become soft and has absorbed water under the slab, or where there has been actual falling away or shrinkage of the subgrade under the slab, it is obvious that the supporting power of the slab must be extended over a much wider area than under good subgrade conditions. The extent of this area appears from the above excerpt from the Werner Transportation Co. case. 12,050 depressions were raised, covering a total area of 1,082,775 square yards. Assuming a pavement width of 18 feet, it will be seen that the average length of such depressions was about 45 feet. At some time during the development of the weak place in the subgrade, perhaps before the pavement has commenced to sink, the subgrade was sufficiently weak under an area of the average length of 45 feet so that the slab over that weakened area performed the functions of a bridge over that area. Thus the gross weight of the vehicle imposed upon the slab over such area becomes the critical factor in the strain imposed upon the slab. That this is a serious condition quantitatively is evidenced by the 12,050 depressions found in Illinois in less than six years.

The District Court found (Finding of Fact 25) (R. 83) that gross weight is of importance in connection with the use of bridges. It is a well known scientific fact, of which the Court may take judicial notice, that when a beam is supported at each of its ends without support between them, both the *aggregate* load and the proportionate distance from the respective ends at which such load or loads is applied are critical factors in determining the amount of weight such beam will bear before it breaks. From all of the above it may be seen that the rigid concrete pavements in South Carolina form not only a ribbon of smooth traveling surface over the natural ground but also a series of virtual bridges covering the numerous places in the subgrade of varying

size where the supporting power of such subgrade, because of conditions described above, has been lessened or has vanished. The foregoing discussion explains the statement of the witness Williamson to the effect that "some concrete pavement in one section may hold up 100,000 pounds. The same identical pavement, as far as construction goes, may break up under a two or three thousand pound load" (R. 160).

It takes no scientific research to understand these plain, simple principles. As the Court well knows the discourse of scientists often tends to obscure rather than explain the ordinary scientific facts known to the average man. There was probably not in existence any better knowledge of the soil, subgrade, and climatic conditions in South Carolina than the collective knowledge of the Legislature. The members of the Legislature, not pretending to be scientists, were probably well aware of the principles here discussed. That there exists ample justification for the 20,000 pounds *gross load* limitation *as a means of protecting concrete pavement,* regardless of the number of axles supporting it, seems absolutely clear. In the face of these well known principles no group of engineers, and much less the Court, can say that the Legislature was wrong in fixing its gross load limit, that its action in so doing was clearly arbitrary or capricious and that there exists no debatable question as to the necessity for or reasonableness of such limitation.

e. The provision in Section 2 that a tractor-semitrailer combination shall be considered as one vehicle for the purpose of the 20,000 pounds gross weight limitation, is valid (Assignments of Error No. 6, 24).

The District Court found (Finding of Fact No. 6, R. 77) that the provisions of Section 2 providing that a tractor semitrailer combination shall be considered as one unit for the purpose of the twenty thousand pounds weight limita-

tion is unreasonable. It made these findings in connection with its findings that the twenty thousand pounds gross weight limitation as to one vehicle is unreasonable.

The gross weight limitation being valid, as explained above, it is plain that these provisions of Section 2 are not only valid but necessary in order to effectuate the twenty thousand pounds gross weight limitation. The same reasons which make the gross weight limitation valid as to an ordinary truck apply to a tractor semitrailer combination because the latter has precisely the same effect, as far as gross weight is concerned, as the ordinary truck, and presents the same gross weight problem.

Thus the Court erred in its Findings of Fact Nos. 20, and 26 (R. 82, 84) and in paragraph one of its decree in enjoining enforcement of that part of the law providing that a tractor semi-trailer combination shall be considered as a single unit for the purpose of determining weight.

The finding expressed in Finding No. 20 that the effect of a tractor semi-trailer combination is not different from the effect produced by two vehicles of equal weight, one following the other, is per se fallacious. It is obvious that the intent of this provision is to prevent more than twenty thousand pounds gross weight being imposed upon highways and bridges within a limit of 35 feet, this being the maximum length permitted such combination. Section 7, Act. 259, (Appendix I, p. 148). Common experience proves that two twenty thousand pound vehicles will not follow each other within that distance. The law of South Carolina prohibits heavily loaded vehicles following each other closer than 150 feet.

Acts of South Carolina of 1937, Act 175, Section 12, page 227, provides as follows:

> "b. The driver of any motor truck or motor truck drawing another vehicle when driven upon a roadway outside of business or residence district, shall not follow within 150 feet of another motor truck or motor truck

drawing another vehicle, and the driver of any motor truck traveling in convoy of two or more such motor trucks shall not follow within 500 feet of any other motor truck in said convoy."

f. The Width Limitation of ninety inches is valid (Assignments of Error Nos. 10, 11, 24).

The District Court found (Findings of Fact Nos. 24 and 26, R. 83, 84) that the width limitation of ninety inches is unreasonable; and in its decree the Court enjoined the enforcement of this width limitation provided the vehicles taking advantage of such injunctive protection do not exceed ninety-six inches in width.

In effect the Court holds the width limitation invalid on the highways covered by its decree, but writes a new act limiting the width under any circumstances to ninety-six inches. The legislative character of such action will be discussed in our point IV. However, we submit that there is not one scintilla of *competent* evidence to support the Court's finding in this respect, that the proper evidence forces an opposite conclusion, that the limitation shows on its face that it is of such character as to be free from judicial interference, and that the Court by its own findings and the terms of its own order convicts itself of its own error.

The only testimony submitted by appellees bearing on the effect of the width limitation was wholly irrelevant for the purpose of showing such limitation unreasonable. They offered much as to inconvenience and added expense to shippers and those engaged in performing interstate transportation service by truck, as to the width limitations which prevail in other States and the percentage of some classes of trucks which are ninety-six inches wide. We submit that under established law, all of such testimony was irrelevant as proof of unreasonableness in the sense in which it is here involved. *Morris* v. *Duby, supra,* 274 U. S. 135, *Sproles* v.

Binford, supra, 286 U. S. 374, and *N. Y., N. H. & H. R. Co.* v. *New York, supra,* 165 U. S. 628, are all authority for the proposition that in the absence of Federal legislation specifically covering the subject and in view of the fact that the regulations covering the subject are within the power of the State, inconveniences to interstate commerce and those engaged in it are immaterial. We submit that under the authority of the same cases last above mentioned the width limitation shows on its face that it is such as to be within the exclusive realm of legislative authority. In addition to this consideration there is ample evidence in the record to support the legislative conclusion. Appellants showed that there are many narrow bridges in the State (R. 187), that there are several 18 feet wide and one fifteen feet wide, that wider vehicles increase traffic on the unpaved shoulders which in turn increases maintenance cost (R. 198, 236), that there are over one hundred miles of pavement in the State system only sixteen feet wide, that most of it is eighteen feet wide, that there is some twenty feet wide and that there is one little stretch in Sumter County only nine feet wide (R. 177, 197), that wide vehicles compel more travel on the edges of the road where traffic is more destructive except in the case of concrete which has been thickened at the edges (R. 236) and that it is easier for the driver of an approaching vehicle to see beyond a vehicle which it is overtaking if the preceding vehicle is narrower, that the angle of vision is cut off in proportion to the width of the vehicle ahead and that "six inches difference (in the width of a truck) would make a great difference" (R. 242).

All this testimony is clearly proper and relevant to show that a width limitation is in fact a measure to promote safety in highway traffic, to preserve the highways and bridges and to support the reasonableness of the legislative judgment. The mere fact that laws of other States may

provide otherwise is wholly immaterial. In *Sproles* v. *Binford, supra* (286 U. S. 374), the Court said:

> " * * * one state can not establish standards which would derogate from the equal power of other states to make regulations of their own."

There are so many obvious circumstances which would affect the reasonableness of a width limitation that comparison with other States is not even persuasive. Such differences include not only difference in pavement widths, but also width of right-of-way, differences in highway alignment and curvature, in grades and even differences in density and kinds of traffic.

The final consideration which should nullify the decree in this respect is the Court's own action. By the limiting of the protection of the injunction to vehicles of such widths as do not exceed ninety-six inches, the Court, by its own action, admits the propriety of and necessity for a width limitation. *It merely disagrees with the judgment of the Legislature and substitutes its own judgment therefor. For a difference of six inches in width limits it presumes to invade the exclusive realm of legislative discretion.* In *Sproles* v. *Binford, (supra)* 286 U. S. 374, at page 388, the Court said:

> "Limitations of size and weight are manifestly subjects within the broad range of legislative discretion. To make scientific precision a criterion of constitutional power would be to subject the State to an intolerable supervision hostile to the basic principles of our Government and wholly beyond the protection which the general clause of the 14th Amendment was intended to secure."

In its Finding of Fact No. 24, the Court assigned three reasons for its conclusion that the width limit is unreasonable, (1) that all other States permit ninety-six inches, (2) that ninety-six inches is the standard width of trucks engaged in interstate commerce and (3) that enforcement of

the limitation would exclude "a large portion of the equipment" used in interstate commerce without material advantage to the safety or preservation of the highways. We submit that the width of the paved or travelled surface of the highways is the basic, physical reason for the existence of a width limit on vehicles which use them. That a width limit of ninety inches is *per se* reasonable for vehicles travelling on the 100 miles of roads in the State system which are not more than sixteen feet wide is a matter that admits of no argument. Where those 100 miles are situated is not shown nor whether or not they are so placed as to be "important" and their relative importance are manifestly questions for the Legislature. The relative necessity for a ninety inch as against a ninety-six inch limit on pavements eighteen feet and twenty feet wide is clearly a question for the Legislature. Since whether or not the enforcement of the width limitation would result in material advantage to the safety or the preservation of the highways is a question for legislative determination, and since the width limits in other States, the standard width of trucks engaged in interstate commerce, and the exclusion of a large portion of the equipment used in interstate commerce, are all considerations which are immaterial and can not operate to inhibit the State's fundamental power, the finding by the Court that the width limit of ninety inches is unreasonable was plainly erroneous and should be reversed.

2. *The decree was based upon the premise that there is a well connected system of concrete roads in South Carolina and the record does not show that such well connected system exists.* (Assignments of Error Nos. 4, 5, 24).

The theory of the appellees' case and upon which the lower Court entered the decree rests upon Finding of Fact No. 18 (R. 81):

> "That the said standard paved roads form a well connected system of highways which have been improved with federal funds as a part of a national system; * * * that they are capable of carrying the commerce which has been developed by modern truck transportation; that federal highways numbered 1, 15-A, 17, 21, 25, 29 and 52 comprise the great arteries of interstate commerce through the State of South Carolina, are of standard concrete paving, as above described, with the exception of a few short stretches, a few miles in length which are not of sufficient importance to justify the denial of the use of these arteries of commerce for the purpose for which they were constructed."

It is the position of the appellants that even if such system did exist and that even if the roads in such system could withstand all of the loads described by the lower Court, the statute is nevertheless reasonable because of its necessity for the protection of all the other 57,000 miles of highway in the State and because of the valid application of the law to all of the roads as an entity, which position will be fully explained at our subdivision 3 of this point. However, it is clear that appellees' case and the Court's findings and decree rest upon the premise that the roads enumerated above form a well connected system of concrete roads in the State, that interstate commerce by truck is carried on over such system, and that the statute is unreasonable because it interferes with part of the *truck* traffic over such system. If this premise fails then appellees' case and the findings and decree fail.

Without in any way admitting that the Court's reasoning is correct (for we contend to the contrary), we nevertheless submit that the said 18th Finding is erroneous because entirely unsupported by the record and that the record in fact shows the converse. The burden of proof to show the unreasonableness of the South Carolina laws rested

upon the appellees. If the issue of whether there is such a system of well connected highways is material, appellees had to show its existence to make their case. *Keokee Consolidated Coke Co.* v. *Taylor,* 234 U. S. 224; *Williams* v. *Baltimore,* 289 U. S. 36; *Lindsley* v. *Natural Carbonic Gas Co.,* 220 U. S. 61; *Interstate Busses Corp.* v. *Blodgett,* 276 U. S. 245; *Pullman Co.* v. *Knott,* 235 U. S. 23.

This they did not do, and the evidence shows the contrary. The following is all of the evidence on this point:

Harry Tucker, Professor of Highway Engineering at the North Carolina State College and Director of the North Carolina Experimental Station at Raleigh, testified for appellees (R. 124). Everything he had to say as to the strength of highways related to plain concrete roads. His actual examination of South Carolina roads was confined to those covered in a trip taken by him and described at R. 126. The roads apparently covered by him, acccording to his testimony, are shown on Appendix VII on page 161 of this brief. He did not testify that the roads over which he traveled are entirely of concrete, and the fact is that there are numerous stretches of low type road interspersed with the concrete portions. This is evident from an examination of the appellees' Exhibit No. 6 (R. 300) and will be more fully shown later herein. Nowhere in the testimony of this witness is there any evidence even attempting to show a well connected system of concrete roads, or in fact of just what type of roads the highway system consists.

Intervener, Interstate Commerce Commission, intervening as a party plaintiff (R. 42, 50) produced as a witness on its behalf L. W. Teller (R. 130). There was no attempt made to show by Mr. Teller's testimony the existence or extent of a system of concrete roads in the state. His testimony material at this point is the following:

> "I do not know what portion of the roads of this state are concrete roads. I do know that some of the

roads within the State Highway System are what they call bituminous surfacing, because I saw some of them Sunday. So far as I know the weight that can be permitted on pavement of the bituminous type cannot be determined analytically or by tests. I do not know as to what weight should be permitted on them. I do not know as to the dirt type of roads within the State Highway System or anything about their designing or what weights they could properly bear; and, of course, I do not know anything about the mileage of these roads. I am not acquainted with the design of the bridges throughout the State Highway System of South Carolina.

(Asked to give his opinion as to what load the roads in South Carolina should bear, speaking of all the roads in the State Highway System:)

"I don't believe that there is anyone that could go over the roads of any State Highway System and say that this road is good for so much, and this road is good for so much and the other road is good for so much. The concrete pavement is the only pavement that we have a means for rational design. The design of the other types must be based on the observation of pavements of that type, under the conditions in which they have to serve under the traffic they are bearing, in my opinion" (R. 134).

"Well, we are talking about interurban roads, and interurban roads are not to any extent at all, so far as I know, built of anything but straight concrete pavement, where the rigid type is concerned. We find a few short sections of concrete bases with brick tops in some states. We find a few short sections of concrete bases, with bituminous top in some states, but by and large the rigid pavement as concerning interurban traffic is the concrete pavement" (R. 136).

The foregoing testimony of witnesses Harry Tucker and L. W. Teller plus appellees' Exhibit No. 6 (R. 300) constitute all of appellees' evidence on the issue as to the existence of a well connected system of concrete roads in

South Carolina. Obviously, the testimony of the two witnesses affords no light on the subject, and Exhibit 6, upon examination as we shall hereinafter show, definitely establishes the nonexistence of such a system.

For the appellants, J. S. Williamson, Chief Engineer of the South Carolina Highway Commission in effect testified: There are 60,000 miles of road in the state and about 6,100 in the State Highway System. The other road mileage is under the supervision of county and city authorities. There are in the state system 2,417 miles of standard pavement, 1,724 miles of bituminous surface, 1,141 miles of earth type and 666 miles of unimproved. Of this 2,417 miles of standard type of pavement, there are 1,800 to 2,000 miles of pavement entirely of concrete, and the rest includes asphalt surface with concrete base and asphalt surface with asphalt base (R. 159). The bituminous surface road is made by building an earth type base of some local material and covering it with asphalt as a wearing surface about 3/4 of an inch thick. Such roads are primarily designed for automobile traffic and are not well adapted to heavy loads. They can be constructed at a much cheaper price than concrete pavement. Due to the lack of funds and the demand from the public for surfaced roads, we have had to take what funds we had and spread it over a large mileage, and that is about the only way we could get all-weather roads. These bituminous surface roads comprise about one-third of the surfaced mileage in the State Highway System. Wherever there has been heavy traffic on these bituminous surface roads they have not held up (R. 161-163). There is bituminous surfacing of this kind or other like surface treatment of some kind on practically every road throughout the State. Where there has been heavy truck traffic on bituminous surfaced roads, such traffic immediately caused failures and ruts developed in the surfacing. The wheels of the trucks would sink in and the shoulders were pushed

up. The witness then retraced a part of the route followed by the witness Harry Tucker, pointing out a number of weak bridges and the stretches of bituminous surface on that route and then stated that weak bridges and bituminous surfacing are scattered throughout the State, that on some roads there are more weak places than on others. Also there are stretches of unpaved dirt roads scattered throughout the State Highway System. The dirt roads cannot carry heavy loads (R. 169-170-171). There are about fifty miles of bridge work in the State Highway System and about seventy-five per cent of that mileage has been designed to carry a load not in excess of ten tons (R. 174).

The foregoing testimony of the appellees' witnesses and the appellants' witness comprises the entire testimony as to the extent and continuity of a system of concrete highways. The only other evidence on this point is appellees' Exhibit No. 6 which is in two sheets (R. 300). These two sheets purport to show the Federal Aid Highway System in South Carolina corrected to May 1, 1936, and are published by the Bureau of Public Roads of the Department of Agriculture (R. 137, 198). Their printed legend evidences that they show the Federal Aid Highway system, the portions of such system improved with Federal aid, the portions otherwise improved, the portions of the system under construction, and the types of surfacing of the roads. They show all of the roads described in the decree. An examination of this official map, which is appellees' exhibit, clearly shows that there is no connected and continuous system of concrete highways in South Carolina. Every highway mentioned in the court's decree, and every highway shown on Exhibit 6, has substantially long stretches of bituminous surfacing, macadam, sand-clay, gravel or earth roads. The mileage of the various types of surfacing are shown, by our measurement from this map, in the following table:

Route	Concrete surfacing	Bituminous surfacing	Macadam surfacing	Sand-clay surfacing	Earth surfacing	Not specified	Total
No. 1							
Miles	83.0	71.0	10.2	....	....	....	164.2
%	50.5	43.3	6.2	....	....	....	100.0
No. 15 (Note 1)							
Miles	102.0	17.4	11.0	....	5.5	7.5	145.4
%	70.2	12.0	7.5	....	3.8	6.5	100.0
No. 17							
Miles	133.0	32.4	19.8	....	....	32.4	217.6
%	61.1	14.9	9.1	....	....	14.9	100.0
No. 21							
Miles	150.0	27.6	17.3	17.3	3.2	....	215.4
%	69.7	12.8	8.0	8.0	1.5	....	100.0
No. 25							
Miles	126.0	7.9	0.8	....	....	....	134.7
%	93.5	5.9	0.6	....	....	....	100.0
No. 29							
Miles	88.5	15.0	....	....	....	....	103.5
%	85.6	14.4	....	....	....	....	100.0
No. 52							
Miles	94.0	38.6	11.8	7.9	1.6	....	153.9
%	61.1	25.1	7.7	5.1	1.0	....	100.0
Total							
Miles	776.5	209.9	70.9	25.2	10.3	41.9	1,134.7
%	68.5	18.5	6.2	2.2	0.9	3.7	100.0

NOTE 1.—The decree names as one of the highways "15–A". No highway so designated is shown on the maps in evidence, but No. 15 is. The mileage for 15 is, therefore, included in the above table.

In the map legend, surfaces of bituminous materials are not differentiated to show which are bituminous top on gravel, macadam and similar bases, and which are bituminous concrete, that is, bituminous top with concrete base. The bituminous surfacing shown in the map exhibit 6 therefore includes both. Williamson testified (R. 163) when speaking of low type bituminous surfacing, that there were some sections of that type pavement on practically every road in the State. As shown by the above tabulation, highway No. 29 has only 15 miles or 14.4 per cent of its surfacing of materials other than concrete. It is reasonable to conclude that some if not all of this 15 miles are covered with the low type surfacing referred to. Since the burden is on appellees, and since the bituminous surfacing is not shown to be bituminous concrete, we can not assume that any of the 209.9 miles shown in such column is bituminous concrete. The record clearly shows that only 40 per cent

of the State system, considered as a whole, is surfaced with concrete and bituminous concrete. Surely the State system, taken as a whole, can not be considered to constitute a connected system of concrete roads.

The specifically designated routes are therefore presumably the best in the State and are those which form the so-called well connected system to which the court referred. From this it may be seen that only 68.5 per cent of that mileage or about two-thirds of it are proven by the record to be of concrete of the type which forms the basis of the decree. Not a single one of such roads is proven to be all of concrete and, even if the bituminous surfacing could be assumed to be all bituminous concrete, of which there is no proof, there remains thirteen per cent of the total mileage which the court finds is incapable of supporting the loads permitted by the decree.

It is submitted that the foregoing evidence does not sustain Finding of Fact No. 18 (R. 81) or paragraph one of the decree (R. 85) which, based on such finding, enjoined enforcement of the law upon certain highways comprising the "great arteries of commerce through the state of South Carolina" because such highways "are of standard concrete paving as above described with the exception of a few short stretches a few miles in length which are not of sufficient importance to justify the denial of the use of these arteries of commerce for the use for which they were constructed."

We further submit that the court's finding that there are only a few short stretches of pavement other than concrete, which are a few miles in length, which are not of *sufficient importance* to justify the denial of the use of such roads for the purpose for which they were constructed (Finding of Fact 18), is wholly unjustified, on the record before it. Furthermore, it is not a finding of pure fact but a conclusion. We submit on authority of cases heretofore cited that whether or not gaps in a stretch of concrete road are of suf-

ficient length to be important or unimportant is wholly a question for the exclusive determination of the Legislature.

The record shows that concrete pavement costs from $30,000 to $35,000 per mile (R. 174). There are about 358 miles in the definite segment not shown to be concrete and which might necessarily require concrete construction. At the above figures such construction would cost in excess of ten millions of dollars. The Legislature had a perfect right to consider whether or not the State could afford such an expenditure or whether it preferred to pave other roads in the State before those in such segment. The record shows that traffic over roads other than concrete or bituminous concrete will destroy the road and the court finds the limits reasonable as to such other types of pavement. The mere fact that the enforcement of the law has been enjoined since its inception without visible signs of pavement failure is no proof as to the volume of heavy trucks which operated contrary to the terms of the Act nor that the damage has not been done without it being presently apparent. For through traffic a road is no better than all of its parts. If gaps or portions of a highway are impassable, through traffic on the entire route is frequently impossible. All these and many others were proper subjects for legislative determination alone, and the court was clearly wrong in either finding that an interconnected system of highways exists or that the portions of the named roads not paved with concrete were unimportant. Since the decree was based on the capacity of a presumed interconnected system of concrete roads, which system is not shown to exist, this furnishes another reason for the reversal of the decree. Considered alone this reason is sufficient. Added to other reasons here shown it becomes even more compelling.

3. *The statute is reasonable and necessary as a means of protecting all of the highways and bridges in the State and as a means of promoting safety in their use and the court erred in holding it unreasonable because it had concluded that it was unreasonable as applied to vehicles on a limited portion of the State's highways* (Assignments of Error Nos. 4, 5, 24, 28, 29).

The court held in its second conclusion of law and by paragraph (3) of its decree that the statute is reasonable as to all of the 60,000 miles of highways in the State except those described in paragraph (1) of the decree (R. 84, 85, 86). It then proceeds to separately consider the relationship between the limitations and the limited mileage last above mentioned, to conclude such limitations are unreasonable on such limited mileage, and to enjoin the enforcement of the Act in so far as operations over such mileage are concerned, provided vehicles operated there do not exceed 96 inches in width.

In this respect it is our contention that the decree and action of the court is fatally defective in two different respects, and that in its finding of reasonableness as to all but such limited mileage the court convicts itself of its own error. Such defects are: (a) That in enacting and administering regulations pertaining to the use of public highways a State may treat all of its roads and streets as a whole, and that in testing this reasonableness of legislative action in such cases the entire highway system, as a single entity, must be considered, and that the fact that such limitations might be unreasonable as applied to a limited portion of the total mileage (which we do not concede in this case) is not enough to justify the conclusion that the statute is unreasonable and, hence, invalid, either in its application to all of the roads, or in its application to a limited portion of the same, and; (b) That the court is without

power to arbitrarily (and indefinitely) classify the public highways of the State and sustain a statute, Statewide in its terms, as it applied to part of the roads and enjoin its enforcement as to the remainder, for to do so constitutes a clear case of improper judicial legislation.

Our position as to the absence of *power* in the court to so segregate, classify and separately treat the highways of the State, resulting in the invalidity of the decree *as a matter of law,* will be argued under our Point IV of this brief. Our purpose, at this point, is to show that, since the statute was Statewide in its application, in the light of all the circumstances shown of record and of which the court may take judicial notice, the statute is reasonable *as a matter of fact,* and that the court erred in failing to reach that conclusion.

We submit that in this respect there are at least two broad factual considerations, either of which is sufficient to sustain the conclusion of reasonableness. We contend, first, that the Statewide application of the statute to all highways in the State, without exception, was reasonable and necessary to protect the 57,000 miles of roads in the State not surfaced with concrete or bituminous concrete, and, second, that its Statewide application without exception was reasonable and necessary to protect the thirty-seven and one-half miles of bridges in the State system, constituting seventy-five per cent of such bridges, which were not built to sustain a gross load of more than 20,000 pounds, plus the unnumbered other bridges in the remaining miles of public highways in the State, not part of the State system. We contend in both the above instances the statute was reasonable and necessary not only as a means of protecting the State's property but also as a safety measure.

The decree enjoins the enforcement of the Act as to certain roads described therein, and as to "such portions of

other Federal aid highways as may be of standard concrete or concrete and asphalt construction'' (R. 84, 85, 86).

Incidentally, we observe that there is nothing in the record to clearly define ''*Standard* concrete or *standard* concrete and asphalt construction''. The adjective ''standard'' was indiscriminately used by witnesses for both parties before the lower court, but the record shows that some concrete is seven and one-half inches thick at the sides and six inches thick at the center and that other concrete is eight inches thick at the sides and six and one-half inches thick at the center. Whether or not there is concrete of other dimensions does not appear. If all concrete was intended the term ''standard'' was unnecessary and serves no purpose but to confuse. If it had some meaning it should have been defined. We further submit that there is no practical means for one operating a truck to distinguish between bituminous concrete and bituminous roads without such concrete base. To one driving over the highways the kind of materials beneath the surface can not be readily determined. Had the Legislature been guilty of such slipshod draftsmanship the lower court itself would probably have enjoined its pronouncement under the rule in *Smith* v. *Cahoon,* 283 U. S. 553.

The record shows that all public highways in the State are interconnected and that a vehicle operating on one road, without encountering any physical barrier, may be driven over and upon any public road in the State.

That such vehicles actually are driven over all roads affirmatively appears in the record. Fertilizer *must* be delivered by heavy trucks right to the ''farmer's cotton row or tobacco row'' (R. 199). Net loads of 20,000 pounds of melons are loaded right on the farm (R. 153). Vegetable trucks weighing more than 20,000 pounds pick up full loads on the farm (R. 108, 152). Household goods are moved by van load greatly exceeding 20,000 pounds weight and are

delivered to destination anywhere in the State (R. 145). The witness Williamson testified regarding roads which bear traffic of heavy trucks: "All of them are subject to some. There are trucks on practically every road in the State, it has been my observation. There are some trucks on every road, every station that I come to" (R. 163). Obviously these operations take the trucks off the concrete highways specified in the decree to the rural roads and city streets.

The record also clearly shows that such highways are of all kinds of construction (R. 126, 159). The record also shows that different kinds of soil in the subgrade vary in their supporting power and result in different strength or capacity of the surfacing which covers them (R. 160), that such subgrade conditions make such a great difference in the supporting power that "some concrete pavement in one section may hold up 100,000 pounds", but that "the same identical pavement, as far as construction goes, may break up under a two or three thousand pound load" (R. 160). The record also shows a great variety of subgrade conditions in South Carolina (R. 179).

With reference to bridges the record shows that there are about fifty miles of bridge work in the State Highway System alone and that of these bridges about 75 per cent have not been designed to carry a load in excess of ten tons, the amount provided in the statute (R. 174). This testimony is not controverted.

It is common knowledge that weak and insufficient bridges are numerous and common on public highways in South Carolina and elsewhere. An interesting description of that situation and its effect is found in articles appearing in the September 1936 issue of "Scientific American", entitled "Horse and Buggy Bridges" at page 138 and in the September 1936 issue of "Readers Digest", entitled "Forgotten Bridges" at page 53.

The Court found, (Finding of Fact 25), and there was evidence to support it, that a gross weight limitation is of importance, and by that we presume proper, in connection with the use of bridges, although it disagreed with the Legislature as to the amount of the gross weight limitation as applied to "modern bridges". Appellees did not appeal from such finding. The Court found (Finding of Fact 26), and the evidence supports it, that the assailed limitations are not unreasonable as applied to all but the definite and indefinite segments of roads mentioned in the decree, thereby concluding them to be reasonable as to some 57,000 miles of public highways which remained both within and without the State system. From this finding the appellees did not appeal.

By such finding the Court identified the statute. It found the legislative action to be within the *power* of the Legislature, that there was a sufficient relationship between the statute, as the means, and the end which was within the legislative power, as to result in the statute's validity. We submit that by such action the Court did enough to hold the statute valid in its entirety, and that its own finding in this respect, is the proof of the invalidity of its act in holding the statute invalid as it applied to part of the roads.

Bearing all these uncontroverted facts in mind, it is submitted that the Legislature had the absolute right to consider and to judge all of the practical problems involved in the enactment and application of the statute in question. There are readily obvious problems of administration if the roads are to be classified and different weight and size vehicles permitted on different roads. How many classes should be made for the different types of roadway and different types of vehicles? What weather, seasonal and traffic conditions should influence the permitted weights? What will happen to detour roads while gaps in a strong system are being built? Can heavy vehicles be practically confined

to a limited mileage of stronger roads? Will congestion result on these so-called arteries while loads are being transferred from large to small vehicles? How can the law be enforced? How many patrolmen would be required and what would it cost? Will the mere posting of a sign on a weak bridge prevent the driver of a truck from passing over it? If the admonitions of the sign are disregarded what would be the result to the bridge and would the safety of others be endangered by such disregard? Would officers have to be stationed at such bridges to enforce the limitations and, if so, what would it cost? If heavy loads are to be permitted on the approaches to a bridge but prohibited on the bridge, as is provided in the decree, must an officer stationed there stand like Horatio and defy the drivers of units thought to be too heavy without power to arrest or even to weigh the threatening vehicle until the line is crossed and the damage is done?

In the light of all these circumstances, the Legislature saw fit to lay down one limitation covering all of the roads of the State and applicable alike to interstate and intrastate commerce.

All these and many others are practical questions which, in the wisdom of the courts throughout the years, have been left to the exclusive discretion of the Legislature. We submit that when these and many other practical problems are fairly considered it is readily obvious that, in the enactment of the statute, the Legislature did not attempt to exercise a forbidden control over interstate commerce in the guise of a police measure, but wisely and fairly adopted a measure honestly intended to protect its roads and bridges, and the safety of those who use them, to promote, and not prevent, interstate commerce by passenger automobile and light trucks by preserving smooth all-weather roads over which they may travel, and to conserve the State's finances by surfacing in the future more miles of the remainder of