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THE BICYCLE ERA

HON. ALEXANDER PIRNIE

OF NEW YORK

IN THE HOUSE OF REPRESENTATIVES

Monday, April 19, 1971

Mr. PIRNIE. Mr. Speaker, it has occurred to me that the following study conducted at Davis, Calif., would be of value and great interest to all as we seek to develop new methods of intracity transportation. Not only have traffic congestion problems been solved, but in my mind a healthy form of exercise is being carried on. Through the cooperative efforts of community leaders a program of multiple value is being implemented. I commend this study to my colleagues and to the public:

BIKEWAYS IN ACTION: THE DAVIS EXPERIENCE
(By Robert Sommer and Dale F. Lott)

Leaving the freeway and entering Davis the motorist sees a large sign telling him that this California city has 18,000 bicycles. Considering that its population is only 24,000, probably no other city in the United States has as high a proportion of its citizens owning bicycles and using them as a regular means of transportation. A number of factors produced this situation—the presence of many young people attending the Davis campus of the University of California, the flat terrain, the mild weather, and the many wide streets. When the campus expanded greatly and the population in the area grew rapidly in the early 1960's, the streets became much busier. About the time the first stop light was installed, people riding bicycles began to feel crowded. At the local bicycle shop, it was common to see bikes appearing with damaged front wheels when riders were forced into the curb by passing cars. Competition, both for space on the streets and opportunities to cross at intersections, grew between bicycles and automobiles. It was a lopsided competition at best—bicycles are small and frail, automobiles large and sturdy. It became clear to a number of concerned Davis citizens that if bicycles were to remain a viable part of the city transportation system they would have to be given a place of their own in city traffic planning.

What was needed was some way to separate bicycles from automobiles and the plan adopted was the bicycle path or bikeway—a strip of pavement or concrete from which automobiles would be excluded. At first this suggestion was rejected by the city council; it was considered to be visionary, impractical, and potentially dangerous and its proponents were regarded as cranks. Letters to the editor proclaimed that the day of the horse was past and the day of the bicycle was passing. It was time to build more and larger parking lots and shopping centers. Citizens were urged to welcome the 20th Century to their city, and forget the gay nineties and all its trappings. However as the debate continued, it became apparent that there was widespread support for bicycle paths. A citizen group circulated a petition asking the city council to establish bicycle paths along principal streets and rights of way of an integral part of the city's transportation system. This petition was signed by 90% of the several hundred voters approached. Bike paths became the central issue in a city election of 1966 and the pro-bikeway candidates won. Soon after that the first bike paths were established along the sides of existing wide streets.

Since that time, Davis has been developing a bicycle path network that is probably unique in the United States. New housing tracts in the city are required to set aside space for bicycle lanes separated from traffic and a special act was passed by the California Assembly to enable the city to formulate traffic regulations for bicycles. It is important to realize that the bicycles are not merely owned, stored, or used for recreational

purposes; they are an important part of the transportation system. On one heavily trafficked street, traffic counts during the summer (with few University students in town) show that bicycles represented 40% of all traffic. During the rush hour, 90% of all riders are adults. The emblem of the city shown on many municipal vehicles is a gay nineties two-wheeler. Many business leaders in the community are strong proponents of bike riding and admit that this is a matter of self-interest. The use of bicycles has meant that there are no parking meters in the city and the traffic situation at rush hours is tolerable. The bicycle has also helped to preserve the central city core as a viable shopping district, since parking is not a serious obstacle to shopping downtown. The University and high schools have been able to set aside less space for parking lots than they would ordinarily. The acceptance of the bicycle as a viable means of transportation by virtually all segments of the community provides the unique opportunity to learn the structural and social requirements of safe, efficient, and pleasurable bike riding.

The potential of bicycle transportation cannot be realized without the necessary environmental support system. Just as one cannot have a railroad without tracks, or a bus system without highways, so one needs special facilities and regulations for bicycle traffic. This means planning which must rest on firm knowledge of these special requirements of the bicycle. One simply does not design highways for automobiles and sidewalks for pedestrians, leaving bicycles squeezed in between moving automobiles, parked cars and pedestrians.

First let us review the history of the Davis bicycle path network. About 8 years ago a group of concerned citizens formed the Bike Safety Committee which investigated bicycle traffic problems in the city and made various suggestions about how to alleviate them. The city Public Works Department became interested and made traffic counts to determine the streets most heavily used. There was very little precedent to follow in developing bike lanes. The City Public Works Department believed that the most feasible plan was to create bike lanes on the outside of the streets over 50 feet wide. Where this contradicted the California Motor Vehicle Code, a special bill relating to bike lanes was passed with the help of the State Assemblymen. This bill permitted the Davis City Council in 1967 to pass Ordinance 442 creating bike lanes and regulating bike traffic. The Davis City Council is very favorable to bicycle lanes and present plans call for 12 miles of bicycle paths by 1974, including 5 miles of lanes completely separated from the roadway.

The establishment of these pioneering paths offered an opportunity to study the use of the path, the attitudes of car drivers, bike riders, and city officials toward them, and the effect of the paths on safety. The safety record of the lanes is very good. Thus far not a single car-bicycle collision has taken place in the bicycle lanes. Damaged front wheels are rare problems at the bike shop. However, while the lanes protect the riders for the length of streets, they left them exposed, and in a somewhat more vulnerable position, at the intersections. There are some real problems connected with left turns from inside the bike lane, particularly when automobiles are turning right from what has become the center lane. There are also problems about educating out-of-town drivers about the bike lanes. For these reasons, and with the assistance of a small grant from the National Safety Council, we undertook a study of the bicycle path situation in the city. We felt that this information would be helpful to other cities planning bicycle paths. Over the past three years we have conducted a number of surveys among city and police officials, bike riders, and car drivers. Our goal was to get an overview of the bicycle situation in the city, the ways in which problems connected with the bicycle have been met and to specify the problems that remain and how they might be solved.

In Davis the great bulk of the population lives within two miles of both downtown and campus. During the Spring of 1970 Marie Koviak interviewed 327 young adults living in apartment houses at various distances from the campus and downtown. The bulk of those surveyed were college students. The percentage of students using bicycles as transportation to campus was the same whether they lived two blocks or two miles away, but the rate of use was not. Those students living within a mile averaged about 10 round-trips a week, while those 1½ to 2 miles away averaged about five round-trips per week. The percentage of non-student young adults who use bicycles is about 70% (no different than the students) but the number of trips per week is somewhat less. Both students and non-students rarely used their bicycles as transportation at night. There are approximately ten times as many trips during the day as at night.

It is the writer's feelings, supported by our survey results, that the bicycle path network in the city is an important factor in this heavy use of the bicycle. At Santa Barbara, where another campus of the University is located on flat terrain, one finds much less frequent use of the bicycle than at Davis.

The Davis city officials were very favorable towards the bicycle paths. However, to a man they commented about the intersection problems—the paths provided safety while riding parallel to the curb but did not help much at intersections. They also mentioned the need for continuous public education. It was difficult to reach new residents, incoming students, and people who live elsewhere but come to Davis to work. The bike riders we interviewed were also favorable towards the paths. They felt it was safer and less anxiety provoking to ride in a bike lane. Virtually everyone stated his preference for a bike path over a conventional street if the distance were the same.

We were interested in knowing whether or not bike riders like bike lanes enough to go out of their way to use them. In our first survey we asked all bike riders if they would go a block out of their way to use a bike lane. Only 1 in 5 said they would.

The study of young adults in apartment houses asked a slightly different question, "Do you go out of your way to use bike paths?" In their answers to this question college students and other young adults differed. Among the students 1 female in 4 and 1 male in 7 said they did. On the other hand when the young adult non-students were asked the same question 60% of the males and 75% of the females said they did.

The other responses supported the idea that many people would take the bike paths when available but would not make an extra effort to reach them. Virtually all of the automobile drivers who were interviewed in various parking lots, were favorable to the bike lanes. Most confessed to feelings of apprehension when they rode on a street that contained mixed car and bike traffic (i.e., without bike lanes). They felt that the paths made it easier to drive since the driver didn't have to worry about bicycles. The only improvement in bicycle paths they proposed was creating more bikeways and marking them better. Only two of the eighteen drivers said they ever went out of their way to avoid streets with bike lanes. As a follow-up, a smaller survey was undertaken in Woodland, California a nearby city of approximately the same size as Davis, but with a much smaller number of bicycles. The city officials interviewed said that Woodland did not have a significant bicycle problem and special bicycle paths were therefore unnecessary. In Woodland the use of bicycles (with identical terrain and climate to that in Davis) was almost exclusively restricted to school children. All of these interviews were uninformative since the respondents had no contact with separate bike lanes and lacked any opinions about their potential value. It was clear that the bicycle was viewed as a minor and incidental part of the traffic situation in Woodland—something to be used by children getting to and from school. However, the survey did seem of some educational

value to the adult respondents. A few of them, particularly parents, considered for the first time the possibility of bike lanes in Woodland.

During the spring of 1970 a door-to-door survey was undertaken by Frank Becker in 132 households in a residential neighborhood of Davis. This is largely a white middle-class neighborhood with single family dwellings. Approximately equal proportions of men and women owned bicycles, and ownership was clearly related to age. Of the adults in the 25-35 range, 60% owned bikes compared to 46% of those age 36-45, and only 14% of those over 46. More husbands than wives use their bicycles regularly. The major destination of the husbands was the University where they were employed or went to school, while for the women the major destinations were downtown stores or other households in the neighborhood. More men's bikes than women's had lights on them, which supports the greater reliance of the men on the bicycle for transportation.

Virtually all of the parents had discussed bicycle safety with their children. The major items mentioned were cautioning the children to watch out for cars, signaling, driving on the correct side of the street (moving in the same direction as automobiles in Davis), stopping at lights and signs, staying in bike lanes not hurrying, and obeying traffic rules. Several parents taught bicycle rules and safety to their children during actual practice rides. Two-thirds of the parents had specifically instructed their children to use streets with bicycle lanes whenever possible, and those who hadn't, often mentioned that there were no bicycle lanes between their houses and the children's school. The vast majority believed it was safe for children to ride bicycles in Davis, and that this was due largely to the bicycle lanes. Most everyone wanted to see more bicycle lanes in the city, as well as better enforcement of existing regulations, both for bicycles and automobiles. Specially this means keeping cars out of bike lanes, especially at intersections where cars moved into them to make right turns. No respondent expressed any dissatisfaction with the bicycle lanes or wanted to see them removed or restricted. In no case were bicycle lanes considered an inconvenience. Each respondent was asked directly whether he had ever avoided driving a car on a street containing a bicycle lane, and not a single one answered affirmatively. Most felt safer driving along a street with bicycle lanes because there was less to worry about. On the other hand, few were willing to go out of their way to drive on a street with bicycle lanes.

The parents were asked about bike usage by their children. Age was the determining factor in how far and when a child could ride. Preschoolers were restricted to the immediate vicinity of the home while children between six and twelve were allowed to ride to school. About half the children in this age group were allowed to ride downtown to the movies during the day, but not at night. Almost half of the junior high school students rode their bicycles to school every day, were permitted to go to daytime movies, and about half were increasing radius of distance and freedom of movement. However, some 16-18 year olds were still not allowed to ride bicycles at night, thus emphasizing the perceived hazards of night riding. To supplement the interview data, a brief survey of bike use was made in the nearby elementary school. Initially we had planned to do more work in the schools, but the close of the school year prevented this. The interviewer visited one class at each grade level to determine the number of students who had ridden their bikes to school that particular day. None of the kindergarteners had come by bike, compared to 22% of the first graders, about half the students in grades 2-5, and 71% of the sixth graders.

OBSERVATIONS

Along with the surveys, we have also observed bicycle traffic patterns in various parts of the city. Early in our work, it appeared that there were serious problems connected with signaling. In the driver education programs, school children are taught the various hand signals for turns yet even the most cursory observation of bike riders showed that very few people use hand signals. This is particularly true for right turns. A few hardy individuals will signal for left turns, but they are a definite minority. In fact where traffic is particularly heavy, signaling may be dangerous since it requires the rider to remove one of his hands from the bars and keep it in a nonfunctional position which may adversely affect his balance.

Another problem concerns stop and yield signs. We have collected several thousand observations of bicycles and cars at different types of intersections. It is not easy to obtain a clear-cut definition of what "stopping" means. When pressed for a legal definition, a police official is likely to give the literal phrase "the complete cessation of movement." In practice this can be measured in several ways. Some policemen insist that the rider's foot must come to the ground. Others will use wobbly handbars as an indication of stopping. Whatever criterion is used, our observations indicate that whether or not a rider stops at an intersection is determined

less by the sign at the corner than the presence of traffic in the intersection. Before a rider reaches an intersection he looks up and down the street. When his head sweep shows traffic present, he will stop to the point of placing his foot on the ground, but if the intersection is clear, most riders will continue.

Bicyclists show much greater respect for stop lights than for stop signs. This might explain the results of another survey dealing with preferred route from domicile over to the University campus. The investigator (David Kenny) was impressed by the fact that bike riders chose one route to campus and car riders another. Further analysis showed that the bicyclists' preferred route contained an average of 4.9 stop signs and 1.8 stop lights. The automobile drivers chose, from the same origin to the same destination, a route that contained an average of 2.3 stop signs and 4.2 stop lights. Our observations provide some basis for interpreting this difference. Bikes don't usually stop at stop signs, they simply slow down and continue through, traffic permitting, while they stop completely at stop lights. For a car rider, subject to greater enforcement pressure, a stop sign always means stop, but he has a 50-50 chance of going through with a light. Another observation is that bicyclists generally make more turns than automobile drivers do. This may be due to the increased maneuverability of bicycles or to the fact that they are used for shorter trips than cars whose drivers choose the most direct route. Whatever the reasons, the greater frequency of turns by bicyclists compounds the seriousness of intersection problems.

EXISTING PROBLEMS AND RECOMMENDATIONS

The major problems connected with the bike paths appear at the intersections. There is some difficulty in making a left turn from the inside bike lane or a right turn from the automobile lane where there is cross traffic present. Many bike riders and automobile drivers are unsure as to the proper turn procedures. The Davis Police Department distributes diagrams showing the proper turn procedures to school children and these are reprinted in the local newspaper. Some bicyclists sometimes solve the left turn problem by making their turn in the middle of the street before the key intersection. The result is that they are riding up the bike lane in the wrong direction, confusing the traffic situation for both car and bike riders.

Recommendation: If accidents or near-accidents resulting from left turns from bicycle lanes increase, some action will be necessary. One possibility would be to prohibit left turns from bicycle lanes at key intersections during peak traffic. This is similar to what is done in many cities with automobiles where one finds signs at key intersections declaring "no left turns between 7 and 9 a.m. or 4 and 6 p.m." With an appropriate campaign of education and enforcement, there would be value in signs in bicycle lanes that tell the bike rider at key intersections "no left turn between 4 and 6 p.m." In addition to going one block beyond the intersection and making his turn, he has the option of dismounting and walking his bicycle across the intersection, thus gaining the priorities as well as the increased safety of a pedestrian. In Amsterdam many of the bikeways have independent signal lights (a green, yellow or red bicycle light up on the post), and these could make provision for bicycle left turns.

Problem: Drivers from out of town do not understand the bike lanes and occasionally drive in them. This behavior is understandable since the drivers have received no clear instructions as to the meaning of bike lanes.

Recommendation: A large sign at each of the major entrances of the city to inform visitors that driving in bike lanes is prohibited. Formerly the bicycle lanes as well as the center strips had been painted white, with bicycle signs over the sidewalk on the right lane. To help inform out-of-town drivers that they should stay out of bike lanes, the city authorities have now changed to a broken yellow line for the center strip and a solid white line to delineate the bicycle lane. The most unpleasant feature of the bikeway network in Holland is the ubiquitous presence of motor bikes (brown-fels). While riding on bike paths alongside the highway, it was frequently necessary to look back to see if a bromhead was approaching since the noise of highway traffic could obscure even the noisy bromhead. In Davis motorized bikes of all varieties are excluded from the bicycle paths.

Problem: Some improvement needs to be made in present signaling practices. The small number of people who actually use signals indicates that the present system is not working.

Recommendation: Possibly drop signals or experiment with bike turn indicator lights.

Problem: Some of the newer streets contain a bike lane which is sandwiched between a pedestrian sidewalk and a parking lane for automobiles. This provides considerable safety for the bike rider but it is difficult for him to see automobiles coming along the street when he wants to pull out because the parked cars block his vision.

Recommendation: Where the bicycle path

is inside a parking lane, the city has prohibited parking at some distance from an intersection so the rider can see traffic coming down the street.

Problem: Bicyclists, particularly children, have difficulty in knowing how to navigate in the parking lots of large shopping centers where the traffic lanes are not clearly marked.

Recommendation: It may be desirable to develop special bike routes in and out of major shopping centers.

Problem: There have been some accidents where bike riders in bike lanes were injured when car drivers opened their doors just as the bike rider was coming along.

Recommendation: Bike riders must be cautioned about the possibility of doors opening in front of them and automobile drivers should be careful to look at oncoming bike traffic before they open their doors.

Problem: Downtown merchants used to be annoyed when the entrances of stores was blocked by bicycles.

Recommendation: The practice followed in Davis was to install bike racks on most blocks in the downtown area and require bicyclists to use them. Many of the bicycle racks were donated by local service clubs.

Problem: There is some ambiguity about the meaning of bikeway, and little standardization in its meaning from one situation to another. In Sausalito, California there are bikeway signs down the main street which is the main traffic artery containing virtually bumper-to-bumper traffic on weekends. In fact one rarely sees a bicycle on this street. In Seattle there are bikeway signs but apparently these only have meaning on certain designated days. The out-of-town driver has no conception of what the signs mean. In Davis one occasionally finds an out-of-town driver in the bicycle lane trying to guess why people are gesturing to him. Some interpret the bicycle lanes to mean that bicyclists must stay in them but that cars can use them too.

Recommendation: The phrase "bikes only" might be preferable to "bike lane" or "bikeway." (Put into effect Fall, 1970).

CONCLUSIONS

The overall conclusion from the surveys and observations is that the Davis bikeways are almost unanimously regarded as a desirable safety feature. At present, many riders will use the paths when they are available but many will not go out of their way to use them. As the city grows (to approximately 75,000 within ten years) this situation will change. A bicycle path that is a good safety feature with light automobile traffic should be a much better safety feature in heavy car traffic. However for the bicycle to remain a viable form of transportation, and not be squeezed out by the automobile, certain structural and social requirements must be met. Just as the automobile requires the availability of gas stations, good roads, highway regulation, licensing procedures, and driver education, so the bicycle requires, in addition to a moderate climate and terrain, the separation of bicycle from automobile traffic at some points, the respect of motorists at intersections, special regulations pertaining to bicycles, bicycle racks in sufficient numbers in the downtown areas, and bicycle education in the schools.

It should be clear that we are not advocating the bicycle as the sole means of transportation within cities or in the countryside. The complexity of modern society requires a mixed system of transportation which would include railroads, buses, private automobiles, bicycles, and pedestrians. Each one of these not only has its unique capabilities and requirements, it also needs to be meshed in with the others. For a suburbansite to drive his car to the railroad station requires parking facilities at the railway station. If he should want to use a bicycle to get over to the station, there should be bike racks available for him. The system of mixed transportation presently available in Holland, the most densely populated country in the Western world, is instructive. A commuter can ride his bicycle to the station and check it in a park inside the station, and then rent another bike when he arrives at his destination. Bicycles can be rented in more than 90 city railroad stations. People on vacation can take along their bikes with them on a special bicycle train run by Netherlands railways. These are not "luxury" programs but rather these are indispensable ingredients of a successful mixed transportation system.

Our research has led us to the conclusion, that at least in the cities—no bicycle paths, no bicycles. This should not be a cause for pessimism as much as an urgent call for action to create and maintain a viable bicycle support system.