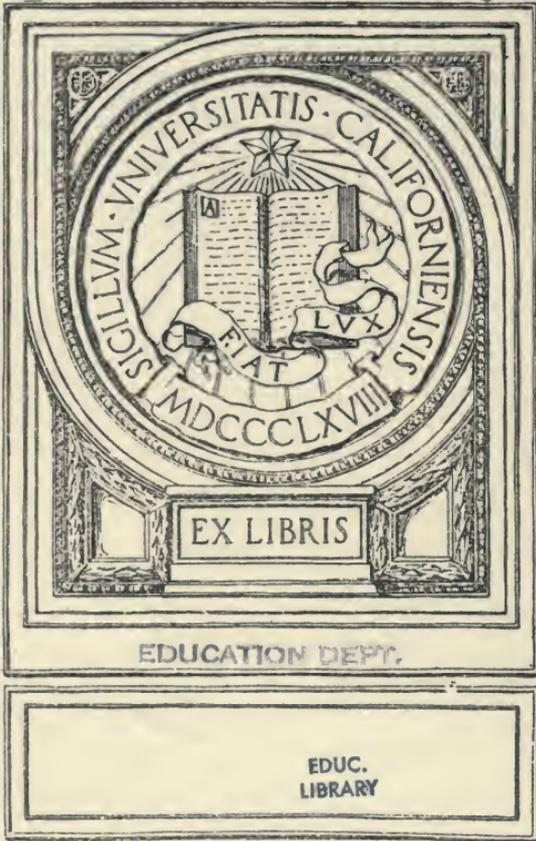


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VI. THE PART-TIME CO-OPERATIVE PLAN OF INDUSTRIAL EDUCATION

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The co-operative plan of industrial education is primarily an attempt to co-ordinate and correlate agencies already existing, at least potentially, in the factory and the school in order to make better workmen and better citizens from the young recruits to the industries. Because the co-operative plan can be undertaken with very little initial investment, maintained at a minimum cost, and adapted to a great variety of conditions, it is the form of industrial education most widely available for immediate realization. Some entertain doubts of the adequacy of the co-operative school in comparison with the independent trade school on the one hand and the manufacturer's apprenticeship school on the other. The co-operative school with shop practice under factory conditions is more practical than the independent school, dependent on its own shops, but the co-operative school runs the risk of having the shop-work subordinated to other interests not consistent with the greatest thoroughness and progress in learning the trade. The co-operative school with its schoolroom work carried on in an efficient school with established standards of its own in equipment, administration, and pedagogical efficiency has a great advantage over the manufacturer's apprenticeship school carried on wholly within the factory; but on the other hand, there is danger that the school work of the co-operative school may not be made to correlate closely with the factory work. The principal difficulty seems to be in securing the right kind of co-operation. It has been shown that the half-time co-operative schools under favorable conditions may become very efficient and possess many advantages over schools of other forms. The short-time co-operative school having less than half-time, usually four hours a week for school work, is less ambitious in its aims than the half-time school and serves a somewhat different purpose.

METHODS OF CO-OPERATION

In all industrial education there are several parties in interest: the manufacturer, the workmen, the pupils, and the public. For the purposes of our discussion the interest of the pupils may be considered as part of the interest of the public. In the public co-operative industrial school the three principal parties in interest may become active participants in the management of the school. It is in the harmonizing and fulfilling of the legitimate aspirations of these three parties in interest that the co-operative school encounters its greatest difficulties and achieves its greatest excellence.

The parties in interest have much in common, but each places greatest stress on some feature that beyond a certain point becomes antagonistic or prejudicial to the interests of the others. The manufacturer properly desires a supply of efficient workmen adequate for the legitimate demands of his industry. If, beyond that, he desires to provide a surplus of workmen in order to reduce wages or break a strike, he antagonizes other interests; if he is concerned merely in speed of production, being indifferent to the social welfare of the workmen; or if he is concerned merely with the immediate usefulness of the apprentice to the industry, being indifferent to his progress in his trade, the manufacturer fails to contribute his full share to the fulfilment of the common purpose; if the manufacturer pays the apprentice less than he earns, that is, if the article produced by the apprentice costs less than the same article produced in the regular factory routine, then the manufacturer is again not dealing equitably with the other interests concerned.

Thoughtful workmen desire to recruit their ranks by means properly safeguarded in order that the industry which gives them employment may prosper and pay them good wages and give employment to their children. If the workmen desire to restrict the supply of labor unduly, or attempt to monopolize the right to work at a particular trade, or resist the introduction of improved methods of management and work, they deprive the manufacturer and the public of their lawful interests.

The first concern of the public is that each person, whether engaged in the industries or elsewhere, shall perform his part in the social organism intelligently, efficiently, respectably, and happily. Ability to do well some kind of productive work is fundamental to social efficiency. It is therefore pre-eminently a matter of public concern to train young recruits for the industries and to insure for them a reasonably free and

fair entrance into the vocation in which they are to achieve self-support and make their contribution to the social welfare. The public interest is comprehensive and, rightly conceived, may include all that is legitimate in the claims of the manufacturer and the workmen. Public control of co-operative industrial schools is able to harmonize the interests of the manufacturer and of the workmen, while effectively securing what is so often sacrificed in the controversies between labor and capital—the welfare of the general public. In the management of such a school the manufacturer, the workmen, and the public should all be represented, but the degree of success of the administration will be largely determined by the extent to which they merge their interests into one control for both factory work and school work.

SHOPWORK

In order to show the relation of the shop work of the co-operative school to that of other schools it is convenient to classify the various forms according to the purposes they serve as: (a) cultural, (b) preliminary trade training, (c) trade training.

Undoubtedly the use of tools in making things by any boy or girl reacts through the sense perceptions on the whole mental fabric, much as Professor Seguin's system of sense-training reacted upon the mentality of the feeble-minded, stimulating and developing it. The one or two hours a week usually given to such work in the public schools might profitably be extended by school or home tasks to five or ten hours a week for purely cultural reasons. Some slight vocational ends are also served by this work, but as a rule it has no point of contact with real trade-training and should be classified as cultural. Another kind of shopwork introduces the pupil systematically to different machines, materials, and processes belonging to a particular trade or group of related trades, but does so in an experimental way only, not attempting to provide the methods, facility, and experience necessary for production on a commercial basis. As a rule pupils in this class of shopwork make only one article of a kind during their course. There is no commercial product or factory system. Such work must be regarded as preliminary trade-training, if indeed it justly escapes the characterization of dilettante, because incapable of being turned to practical account. Good schools of this class are of great value to pupils preparing for higher technical courses for engineers, superintendents, and

foremen, and may prepare for apprenticeship. They do not provide a point of contact for direct entrance to the industry. Shopwork that gives real trade training conforms closely enough to factory requirements to turn out at the end of the course a workman whom the manufacturer will readily employ as a young journeyman. Some schools maintaining shopwork of this character, however, attempt to provide only a part of the whole course required for complete mastery of the trade. This kind of shopwork produces a commercial product which pays for raw materials, usually provides wages for pupils, and may be made to pay overhead charges if properly managed.

TRADE TRAINING IN SCHOOL SHOPS

Many philanthropic trade schools and several public trade schools produce a commercial product in their own school shops. There are many difficulties involved in this undertaking that must be set over against the difficulties of the co-operative plan. In the minds of some the balance is largely in favor of the co-operative plan, whether we consider efficiency in trade-training or problems of administration. Schools that maintain their own shops are at a serious disadvantage, both in the purchasing of raw materials and in the marketing of products. They must establish and maintain their own standards of efficiency in workmanship, speed of production, and *esprit de corps*. Moreover, there is an important psychological effect upon the boy or girl on being brought into contact with the factory in full action: it appeals to the imagination; it is an adventure in an undiscovered country; it ministers to the insatiable desire of youth to know the world. There are apt to be many advantages in equipment provided by the manufacturer in the factory. Such equipment is presumably of the type best suited to economical production; at least it is such as enables the manufacturer to conduct his business successfully. The adaptation of machine tools to the tasks imposed constantly taxes the skill of the inventor and the judgment of the manufacturer as well, who would soon be outstripped by his competitors if he failed to send out-of-date machinery to the scrap heap. I cannot see how a school in which the machine tools were not required to show their adequacy in the cost sheets of production could ever grasp the problem of suitable equipment for the highest productive efficiency, or how a school in which the machine tools did not by a commercial product earn a suitable sum to be set aside for interest and depreciation

could afford to keep its equipment up to date by discarding types of machines and methods that were unprofitable for factory use. While the problem of equipment belongs primarily to the manufacturer, the workman's experience is indelibly impressed by it, and his whole attitude toward his work, as well as his competency as a workman, are materially affected. In the co-operative school the business acumen and experience of the manufacturer are actively enlisted in the management of the school and the completely organized purchasing, selling, and accounting facilities of the factory serve the school at the same rate as the factory.

Nevertheless, it must be admitted that to insure the management of shopwork so as to afford thorough instruction, steady advancement, and comprehensive practice in the various details of the trade are the gravest problems of the co-operative school. In this respect the independent trade school has its greatest advantage. It has been boldly claimed even that "modern industrial methods preclude the giving of such instruction in commercial shops." All must admit the danger that such instruction may be meager, haphazard, or too much interfered with by the exigencies of the factory.

FULL RESPONSIBILITY FOR SHOPWORK

To guard against the danger just discussed, co-operative schools should assume full responsibility for the character of the shopwork. The supposition that the manufacturer would not agree to such a plan is hasty and not well founded. He may be led to see that under a suitable plan in which he has a voice full responsibility by the school may be decidedly to his advantage. The Beverly Industrial School is a half-time co-operative school, having full responsibility and control of the shopwork done in the factory of the United Shoe Machinery Company. The Wisconsin Commission on Industrial Training says of the Beverly plan, "The remarkable point and the safe point, both from the standpoint of capital and labor, and also from the standpoint of true industrial education, is that the arrangement is controlled entirely by a committee." The committee consists of five members of the school board, the mayor, and the assistant superintendent of the factory. The superintendent of schools is the secretary and executive officer of the committee and has general supervision of the school. The assistant superintendent of the factory is chairman of a subcommittee of three on instruction in the school. He co-operates with the superintendent

of schools and the director of the industrial school, and he attends to many of the details of management of the shopwork, but is subject in all these matters to the direction of the committee in charge of the industrial school. In no other way does the management of the factory exercise any authority over the school. The manufacturer's redress is to withdraw co-operation. The Commissioner of Labor in his report of the Beverly school calls attention to the fact "that should the company choose to withdraw its co-operation the school might be compelled to discontinue its work." This must be true of all co-operative schools, since co-operation is not compulsory; but there appears to be no good reason why the manufacturer should wish the school to discontinue its work so long as it is properly conducted.

The idea that such a school is a heavy financial burden to the manufacturer is erroneous. The apprenticeship schools maintained by the corporations are self-supporting, including the cost of theoretical instruction. In the co-operative school, with the theoretical instruction carried on at public expense, there is no sufficient cause why the shopwork may not be self-supporting.

The factory work at Beverly is arranged so that a group of twenty-five boys works in a separate department of the factory in charge of a school instructor as foreman. On the following week the same instructor teaches this group at the school, thus making possible the highest degree of co-ordination and correlation between the shopwork and the school work. The first two instructors of this kind (machinist-instructors in charge of pupils in factory on alternate weeks) in the Beverly school had the following qualifications: R. H. L., with Div. A, four years as apprentice with Fay & Scott, Dexter, Me.; two and one-half years in manufacturing and in tool departments of United Shoe Machinery Co.; three years as machinist in U.S. Navy; one-half year as machinist in U.S. Navy Yard at Brooklyn; graduate of Pratt Institute; six and one-half years as draftsman, and one and one-half years as assistant chief draftsman with the United Shoe Machinery Co.; three years as instructor in machine drawing in the Beverly evening school; one year as instructor in machine drawing in evening classes in Franklin Union, Boston; P. D. S. with Div. B, graduate of Richmond Academy, Augusta, Ga., and Rhode Island School of Design; four years an apprentice, one year instructor of apprentices with Brown & Sharpe Mfg. Co., Providence, R.I.; two months in charge of apprentices with Bullard

Machine Tool Works, Bridgeport, Conn.; three years in tool department, three years in drafting room with the United Shoe Machinery Co.

The boys in the Beverly school do not come under the instruction or supervision of the ordinary shop foreman, do not work beside the regular workmen, and do not share with the regular workmen the use of machine tools. The work to be performed is chosen with reference to the pupils' needs and usually consists of reserve orders for small quantities that need not be rushed.

PART RESPONSIBILITY FOR SHOPWORK

If on account of the boys being scattered through many shops or for other reasons full control of shopwork by the school is not feasible, the manufacturer should be made by agreement answerable to the school authorities for the treatment given the pupils in the factory. Co-ordinators should visit the boys at work frequently, not only to correlate the work but to see that the boy is making suitable progress in the trade and is not exploited selfishly by the manufacturer. The Fitchburg school assumes part responsibility for the shopwork, but there is a lack of definiteness in its requirements of the manufacturers. The director of the school says, "By weekly visits to the shops and inquiries of the boys in their school week, I keep in touch with their work. Should a boy feel he is not getting just what he should he is not at all slow in making the fact known. Then, by taking the matter up with the proprietors and foremen, we soon find out whether or not a change should be made."

NO RESPONSIBILITY FOR SHOPWORK

A few half-time schools and most of the short-time schools (usually four hours a week) assume no responsibility for the character of the shopwork, the wages of the pupil, or any other matters concerning his progress and general welfare outside of the classroom. It is very difficult for the manufacturer, unaided by the school, unless he organizes a regular apprenticeship course, to carry on the shopwork with a due consideration for all the interests represented in the young worker. Few ordinary shop foremen burdened with their regular duties have the time, skill, or inclination to give systematic instruction to apprentices; owing to the extreme specialization in the American factory system, only

one class of operations can be learned in one department; and after a foreman has "broken in" a new boy and made him self-directing and profitable, he is likely to hold him as long as possible. Often the boy himself, misled by larger wages, is content to remain too long on one kind of work. Lewis Institute is maintaining a half-time course without responsibility for shopwork. "The manufacturers have shown their interest in their apprentices by being willing to incur the inconvenience of changing from week to week the boys who are working on a job, besides paying their tuition of fifty dollars a year. It was contemplated that the boys would pay the tuition out of their earnings." A philanthropist is paying the tuition of pupils in this school at present. The Ranken School of Mechanical Trades has a similar co-operative course for "boys employed during the day. The employer pays the tuition fee of fifteen dollars a year." This is a short-time course of seven hours a week. The Cincinnati Continuation School has a typical short-time co-operative course four hours a week, without responsibility for shop work. The city provides "the necessary teachers and general equipment for a school of industrial instruction while the manufacturers pledged themselves to send a sufficient number of apprentices to justify the establishment of the school."

The radical differences in the three types of co-operation in shopwork are due not so much to local conditions as to different conceptions of the functions of the school. The full responsibility plan aims at social welfare through public control while serving adequately each subordinate interest. It is not deemed necessary that the pupils should be indentured, the manufacturer restrained from terminating his co-operation after reasonable notice, or the authority of the school instructors over shopwork restricted. This is the highest type of co-operation and should be approximated as closely as possible wherever half-time schools are established. Short-time schools are a palliative, but not a cure, for the lack of intelligent and technically trained workmen. They represent perhaps the minimum requirement which should be made compulsory for all persons under eighteen years of age engaged in the industries. The report of the Wisconsin Commission on Industrial Education aptly says: "Your commission believes in doing something where nothing has been done . . . in meeting in some way, however meager, the immediate wants of the many. . . . The continuation (short-time) school may be only a stop-gap, but it meets the broadest aim and it will at once reach the greatest number at the least cost."

UNIT GROUP CO-OPERATIVE SCHOOL

For highly specialized industries, such as boot- and shoe-making, a somewhat different type of co-operative school seems feasible though not yet established so far as I know. There are from sixty to eighty operations to be performed in manufacturing an ordinary shoe. The related processes may be grouped into units, such as cutting, lasting, stitching, finishing. An association of manufacturers in a particular industry of this sort could distribute among the different factories the maintenance of the required school units for teaching the whole trade. Pupils could be enrolled for each unit separately, as in the short agricultural courses, in the slack-time classes, and in evening classes in general, but with this difference, that the shopwork would be closely correlated with the school work. Each unit would represent a link in the chain which, completed, would embrace the whole practice of the industry. A pupil completing one unit would be ready to enter the industry as a worker in that one line; a pupil completing the several units would be master of the combined processes of the industry.

PUPIL'S WAGES IN CO-OPERATIVE SCHOOLS

An essential principle in the economical management of trade schools is the utilization of the product of the pupils' labor to pay for raw materials and "overhead" charges and to afford the pupil remuneration for his labor in proportion to his competency as a workman. It is desirable for many reasons that pupils should earn wages; youths from fourteen to eighteen years of age have a passion for earning money like adults; sometimes the money is necessary for their support; but most important of all, wages may be made a powerful incentive to good workmanship and speed of production. One of the great advantages of the co-operative school over the independent school is the greater ease with which pupils may be provided with an abundance of productive work. Paying pupils by the hour for both schoolroom and shopwork is the prevailing custom in co-operative and apprenticeship schools, but each pupil should be rewarded in proportion to his achievements as a workman. Paying the pupil for school work by taking half his shop earnings for that purpose is false pretenses, comparable with much advertised social-betterment schemes that distract attention from an unjust wage scale. Whatever objections may be justly urged against the piece price or task price for regular workmen, it certainly has great advantages for pupils in trade schools. The pay envelope is then to

the pupil a constant measure of his productive efficiency, both in the use of time and in the standards of workmanship. Thus the proper balance between speed and good workmanship is constantly and automatically impressed on him.

When the shopwork is carried on in a separate department of the factory, as at Beverly, the accounts should show clearly the net earnings of the shop. This is the amount that should be distributed to the pupils as wages. The equipment account is debited with the value of all machine tools and permanent equipment and is credited from time to time with interest and depreciation charged up on the operating account and with machines and equipment returned to the manufacturer. The operating account is debited with the cost of raw materials, salary of instructor while in charge of shopwork, salary of shop assistant, wages of pupils, and overhead charges, representing power, light, heat, rental of floor space, interest and depreciation on machinery, accident-liability insurance, and cost of accounting. The operating account is credited with the value of all the product passed by the inspector. The value of the school product is determined by the cost sheets of the same articles produced in the regular routine of the factory. In Beverly it was assumed at the start that one-half the piece price was the proper amount to pay the pupil. At first there was rather a large deficit, but the deficit grew steadily less, so that it became apparent that the enterprise would soon be self-supporting on the half-price basis. As pupils reach the third and fourth years of shopwork their wages should more and more nearly approximate those paid regular workmen. The instructor must control systematically the progress from one machine to another and must curb any tendencies of the pupil to desire to earn rather than learn. The shopwork, after it is once under way, can and ought to be self-supporting, but it should never be a source of profit to the manufacturer, as it seems to have been in apprenticeship schools in some cases. One week in the school followed by one week in the factory is the usual plan of alternation. The State Trade School at Bridgeport, Conn., has a half-time scheme with two-week periods instead of one-week. In the Fitchburg, Cincinnati, and Providence high schools the co-operative classes have the same vacations as the public schools, so far as classroom work is concerned, but work full time in the factory in the summer vacation. Also, each pupil on the school week spends Saturday forenoon with his mate in the factory in order to be prepared to take his

place in the factory for the following week. In Beverly the school work continues forty-eight to fifty weeks a year, the same as the factory work, but on the school week the pupils have Saturday free. The machinist-instructor goes to the factory on Saturday of the school week to prepare to take charge of the shopwork on the following week. Long periods of alternation destroy close correlation between school work and shopwork and are undesirable except for slack-time classes. An indispensable feature of a co-operative school is the keeping by the pupil of a fairly complete record of all his shopwork. This record should include amount and description of articles worked on, time spent, free-hand dimensional sketches of articles manufactured, machines and other tools used, and problems that had to be solved. These records should be summarized to show general scope of the shopwork and number of hours devoted to the different parts of the trade. At Beverly it is deemed best for the boys to use jigs and similar labor-saving devices employed in reproducing standard machine parts until they have gained confidence and judgment in the operation of the machine tools; then they are taught to manufacture tools and jigs and experimental parts of machines. By using jigs at the start, pupils can immediately earn a considerable wage and later the teaching of operations without jigs is much simpler because the pupil understands how to use the machine tools to best advantage.

GENERAL FEATURES OF CO-OPERATIVE SCHOOLS

The public in America is only very slowly coming to realize what European nations generally have recognized, that the education of youths leaving the elementary schools to work at the age of fourteen is insufficient. Many pupils leave before completing the sixth grade even. For those completing the elementary course, their education is inadequate in amount and kind to protect the employer from unintelligent workmen, the community from ignorance of the requirements of social welfare, or the state from an incompetent electorate.

We provide evening schools which are generally compulsory below the fourth grade, but voluntary in respect to attendance above that point. The half-time and short-time co-operative schools are the beginnings of provisions for education during some portion of the ordinary working hours. Among the half-time schools, Fitchburg, Freeport, Cincinnati, and Providence co-operative classes are departments of high schools.

Completion of the elementary course is required for admission and at least one year full-time in the high school is required before factory work can begin. Cincinnati requires two years. Therefore, these schools deal with a select group of pupils, at least sixteen years of age by the time factory work begins. Lewis Institute, a philanthropic school, charging tuition, has a co-operative half-time class. Pupils must be not less than sixteen years old to be eligible to attend. The Beverly half-time co-operative school receives boys fourteen years old that have completed the sixth grade in the public schools. None of the short-time co-operative schools at which attendance is voluntary receives pupils under sixteen years of age. In Cincinnati in September, 1911, attendance, four to eight hours a week, at a continuation school was made compulsory to sixteen years of age for employed youths over fourteen years of age if they left school before completing the elementary-school course. So far as I know, this is the only compulsory day continuation school now in operation in the United States. A report says, "These pupils are now being classified as to the vocation followed, and will receive expert industrial instruction on the completion of the classification."

SUBJECTS STUDIED

Although continuation schools were originally intended to continue the regular elementary-school subjects, they are now chiefly devoted to teaching the technical and theoretical subjects required in the trades practiced. The plan of devoting the co-operative school wholly to the acquisition of technical knowledge and trade efficiency was greatly encouraged by the example of the apprenticeship schools maintained by the large corporations, by the demands of manufacturers not maintaining their own schools, and by the desires of the pupils themselves who hoped to increase their wages by this study. The philanthropic trade schools have also for the most part limited themselves to satisfying the demands of the trade, and give no separate place on the program for the cultivation of personal, social, and civic obligations. A report of the machinists' continuation school at Cincinnati says, "The general culture work has been, perhaps, the most difficult to work out. The school authorities have felt that such work was absolutely essential, while the majority of the boys were inclined to the opinion that it was a waste of time. The problem that confronted the director was to give

the culture work in such a way that the practical value would be evident." Acquiescence in dropping the formal studies of the public schools has been more ready because many that left school to work were not book-minded. Retarded two or more years, they give up and go to work because the school tasks seem beyond their powers. Such pupils can be reached and benefited only by some new method of approach.

This suggests that a new application of the psychology of interest and motivation is required for our industrial schools. May not the love of creative work that enables youths to take so kindly to shop work serve to motivate the personal, social, and civic betterment subjects? May we not with profit change our requirements from memorizing books to right actions; from book civics to intelligent participation in civic life; from formal physiology to hygienic living; from economics to social service; from grammar and composition to shop records and business and social documents? We need less formality, but more concentration, effort, and self-control. Formal examination papers may give way to tests of correct action and correct attitude in the personal problems of daily living. May it not be possible, also, that the industrial school, affording the pupil abundant sense stimuli and experience in manipulating materials and machines in creative work, is a far more effective organism for promoting mental development, at least for certain types of mentality than the bookish courses of the ordinary schools? There are two great purposes in industrial education: first, to cultivate a finer industrial intelligence, a greater skill, and a higher productive efficiency as an industrial unit; second, to develop a finer social intelligence, a controlling moral purpose in action, and a consistent activity according to ability in civic affairs. Experience may prove what some of us already suspect, that these two purposes may be closely correlated. Making an honest living contains the elements of living an honest life. Industrial efficiency, functioning in the person, implies such fundamental virtues as diligence, responsibility, self-control, and co-operation. Industry and right relations with fellow-workmen are an excellent approach to right relations to the community and the state.

Finally, there is a culture resulting from doing and being more vital than the culture derived from books alone. Industrial education makes this vital culture possible in greater or less degree to a class of individuals for the most part hopelessly out of reach of the traditional streams of liberal education.



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