ASPECTS OF CONSOLIDATION OF FARMS IN SOME EUROPEAN COUNTRIES [1]

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SUMMARY

A comparative analysis of five European countries is given as regards the evolution of land consolidation programmes.

Some of the new contributions which a modern land consolidation scheme can make towards the equipment of backward rural areas are: replacement of farmsteads, linked with slum clearance, enlargement of farms which are too small, and an effective not too dense road network.

INTRODUCTION

It is hard when a farmer who is striving to run his farm on sound rational lines is thwarted by adverse circumstances which he is powerless to alter. And such a hard fate is the lot of millions of farmers throughout the world. Even in Europe there are large areas where, owing to inheritance down the centuries, farms have been split up into numerous plots which are widely scattered over the whole district. It is not possible for such a farmer to use modern, economical machinery and implements on these plots, which are too small and inconveniently shaped for that. In short, he cannot keep abreast of the times; and nowadays to halt means to decline. Labour productivity, which ought to increase, stagnates or even decreases. Development in such regions takes place more slowly than is normal, and it is not long before they come to be termed underdeveloped areas.

The economic, social and political consequences of pauperization of rural areas are so serious that no responsible government wishes to shirk facing this challenge of our time. The crux of the matter is the creation of conditions ensuring farms which are economically and socially healthy – farms on which the capital and labour available can be made completely productive. To achieve this, more will have to be done than merely to integrate scattered holdings of land. Accordingly, throughout almost the whole of Europe an evolution from simple consolidation programmes to all-round rural development schemes is taking place. At the same time, endeavours are being made to accelerate the tempo of consolidation, because in most countries the rate at which it is taking place at present is too slow to effect a reasonably quick improvement in rural conditions.

We want both to plan consolidation on a broad and many-sided basis, *and* to accelerate its execution. These two requirements of our modern age are often incompatible.

In the following pages it will be seen how various countries are endeavouring to bring these two opposing demands into harmony with each other.

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What countries ?

To enable a clear general view of the subject to be obtained, only a few countries or parts of countries have been chosen as examples. These countries took part in an inquiry into consolidation conducted by the International Commission of Rural Engineering in 1955. From the results of this inquiry much of the material in the following article has been taken.

Bavaria has known consolidation for centuries and, together with the other states of the Federal German Republic, presents a picture of vigorous development in this field.

For some time past, *Switzerland* has also been applying consolidation measures, which reached a maximum during World War II.

France began to tackle the problem on a large scale a short time ago, and now has an extensive programme before it.

The Netherlands has likewise only occupied itself with consolidation for the last few decades, but advances made since the end of World War II have been so dynamic that in 1954 it was necessary to introduce a new, very progressive law to create a basis for evolution towards comprehensive rural development schemes.

Finally, *Sweden* has now reached a very advanced stage of development and has largely won the battle against fragmentation.

Present fragmentation of holdings

Present conditions of fragmentation of holdings greatly differ in the five countries mentioned above, partly owing to differences in topography and inheritance customs, partly because the countries concerned are all in different phases of development as regards consolidation.

In Bavaria the degree of fragmentation is considerable, but, as a rule, the parcels of land lie fairly close to the relevant farmhouses. Ever since 1600 the object in consolidation programmes has been to shift systematically the location of a number of farmsteads and to rebuild them in the middle of the land appertaining to them, converting the holdings concerned into "Einzelhöfe" (= unitary farms). In Switzerland and France the fields lie, on an average, almost 2 km from the farmstead. This means that many fields are 3, 4 or 5 kilometres from their centre of exploitation. Fragmentation is particularly serious in mountainous regions, in which each farm possesses a parcel of land in the valley, at the foot of the slope, and on the mountain itself.

In the delta region of the Netherlands the constant menace of water has forced the population since time immemorial to take advantage of available high ground and crowd together in concentrated dwellings or in long villages straggling along the dykes. In many other parts of the country, however, farmsteads and houses are found scattered over the landscape. Owing to these factors, the average situation as regards fragmentation of holding is not so unfavourable as in many other countries.

Finally, Sweden occupies a pre-eminent position in this respect, partly due to a very active consolidation policy.

Table 1 Present fragmentation in some European countries (c.q. influenced by consolidation).

	Bavaria	Switzerland	France	The Netherlands	Sweden
Average number of fields per farm . . .	11	10	12	4.3	4
Average distance from field to farmstead (in kilometres)	0.5	2.0	1.5–2.0	1.0	0.6

FIG. 1a OLD SITUATION.

FIG. 1b ACCELERATED CONSOLIDATION PLAN (in French: "réunion parcellaire").

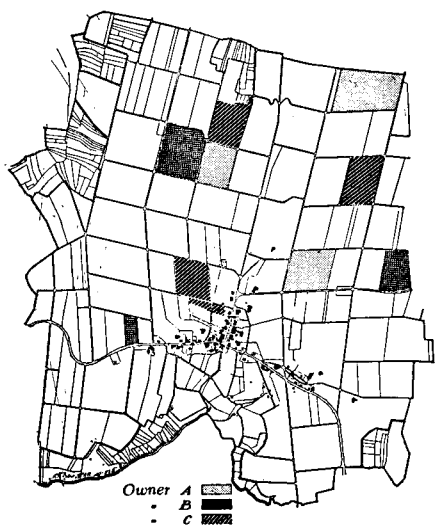

FIG. 1c COMPLETE CONSOLIDATION PLAN (in French: "remaniement parcellaire").

FIG. 1 In the canton of Vaud (Switzerland) in some cases an accelerated consolidation plan (Fig. 1b) is accepted, being an intermediate stage between extreme fragmentation (Fig. 1a) and a complete consolidation plan (Fig. 1c).

No two countries mean the same thing when they speak of consolidation. In the Netherlands we tend to use the term to cover almost all measures and works carried out with the object of improving the external production factors of agriculture. Switzerland also affects this wide interpretation, but nevertheless regards it as something out of the ordinary; accordingly the Swiss have given it a special name alongside the usual one for consolidation, i.e. *"Integral-Melioration"* (integral improvement).

Speeding-up the solution

In many countries, the demand for rapid progress with consolidation of farms has led to acceptance of an accelerated solution to the problem. Such a solution involves restriction of action to consolidation pure and simple, no land improvement work being carried out. In Germany many areas have already greatly benefited from application of this simple solution. In Switzerland accelerated consolidation has been adopted in the canton of Vaud as a provisional measure only (Fig. 1). In France, too, on conclusion of a *first round,* in which the worst aspects of the situation are remedied, things are left as they are for some time, until the commencement of a *second round,* in which roads are constructed and the remaining necessary work is done.

Obviously there are disadvantages attached to such an emergency solution as that mentioned above. For example, in the *second round* of operations the authorities concerned will no longer be free to plan the pattern of the road system as logically as might be, since they will be bound by the land distribution which has been effected. This solution is therefore only applied in places where fragmentation is really extreme, and the situation, as it were, cries out for reform. The Netherlands and Sweden can afford to take their time and do the job thoroughly.

Relocation of farmsteads

An important step in the development of consolidation consists in transferring farm headquarters from one place to another. In certain types of landscape (for instance, those will concentrated dwellings), it is not possible to carry out an effective consolidation programme without replacing a number of farmsteads to fresh sites. In Bavaria and Switzerland this has been recognized from the outset. In the Netherlands relocation of farmsteads has seldom occurred, owing to the high costs of building. However, of late there has been an increasing tendency for old, bad farmsteads in the villages there to be replaced by new buildings on the fields. Accordingly, slum clearance, redevelopment of villages and abolition of fragmentation go hand in hand.

In this field Sweden has a distinct advantage over other countries. There, in most areas farmsteads tend to be scattered over the landscape, and relocation is not necessary as a rule.

Enlargement of farms which are too small

In order to make an agricultural area really "healthy" it is not always sufficient simply to ensure that the land for cultivation lies round its farmstead. A healthy economy demands that farms should not be less than a certain minimum size. Accordingly, as regards regions of small farms the principle applies: consolidation of farms without increasing their size is only

a partial solution, especially nowadays. After all, work on a modern farm is mechanized, to a greater or lesser extent; and mechanization postulates larger units than does manual labour. If it is assumed that, at present, the minimum size for a farm is in the Netherlands eight to ten hectares, when mechanization has progressed a farm at least 15 hectares in area may be necessary in order to make the maximum productive use of capital and labour. Accordingly, the advance of mechanization makes the need to increase the size of small farms more and more pressing.

In order to execute this idea, land is required. Only in a few countries is it possible to carry out expropriation, as part of a farm consolidation programme. In France, land left fallow or derelict can be expropriated, but in practice it is almost always possible to acquire the necessary area amicably by purchase. The same can be said of Sweden.

Bavaria's consolidation programme now also includes enlargement, where necessary, by purchase and sale. In Switzerland attention has been paid to this for some time past, according to a particularly attractive mode of procedure. The value of the land is estimated twice, viz., in its old condition and in its new condition. Thanks to work carried out in the sphere of land improvement, e.g. reclamation and amelioration, the total estimated value of all fields in a block will be greater in their new condition than in their old condition [2]).

Table 2 Nature of the consolidation system.

	Bavaria	Switzerland	France	The Netherlands	Sweden
a) In affecting consolidation, is the accelerated solution applied? . . .	Yes	Canton of Vaud	Yes	No	No
b) Have farmsteads been relocated? .	Yes	Yes	Only in cases of war damage	Rarely	Yes
Are farmsteads to be relocated? . . .	Yes	Yes		Yes	Rarely (usually unnecessary)
c) Are measures taken to increase the size of farms? . .	To be taken in the future	Taken for a long time past	Commenced recently	Commenced recently	Taken for a long time past
How is the ground obtained?	Purchase	"Aufbonitierung"	Purchase (expropriation)	1) Purchase of available ground 2) Purchase of farms from farmers moving to the IJsselmeer polders 3) Purchase of farms from emigrants	Purchase (expropriation)

[2]) The German word used to describe this is "Aufbonitierung": upgrading of land.

In the new situation, the fields are allocated not entirely according to the second estimate, but partly according to the first estimate. When this is done a certain area is left over, which is kept for a "consolidation pool". Hence, once consolidation has been completed, the original owners often find themselves with slightly less land; but what they have now is of better quality. The land in the "consolidation pool" is distributed among farms which are too small, and also to relocated farmsteads.

In the Netherlands great attention has been paid of late to increasing the size of small farms. Endeavours are made to purchase the necessary area within the consolidation block, while, moreover, in some cases it is possible to move farmers to new farms in the IJsselmeer polders (formerly the Zuider Zee) or in other areas covered by reclamation schemes. Finally, emigration to Canada, Australia and New Zealand is also being encouraged.

Pattern of the road system

The nature of the consolidation system, farmstead relocation and planned increase in the size of farms, are some of the features determining the new face of the landscape, and consequently the pattern of the road system [3]).

Bavaria and Switzerland lay down road networks the meshes of which, in our eyes, are quite extraordinarily close (Fig. 2). The highest figures for lengths of road are found in mountainous regions – where, after all, roads with "hairpin bends" are required. Furthermore, in these countries it is customary to project a road along each of the two short sides of a field. This is held as a basic principle which can only be departed from in flat grassland regions and where very small fields are concerned. For in undulating regions the fields lie in the direction of the slope. In such cases the upper road is used in bringing manure, and the lower road can be used in removing the harvest. In both cases the direction in which the farmer walks or drives on the field with a full load is a downwards one. Moreover, the farmers like to have roads on both sides of their fields, to use as headlands.

France, too, would like to apply the *two-road-system* in hilly country; but the cost is considered to be prohibitive.

Sweden and the Netherlands adhere to the principle that a field should border on *one* road. In Sweden, this is the result of exhaustive researches connected, in particular, with the name of Myrbeck.

In the low regions of the Netherlands the hydrological situation renders the *two-road-system* downright impossible, as a channel for discharge of superfluous water often has to be constructed midway between two roads.

If such a channel were to be flanked by a road, only half the fields would derive any benefit from it, while, in addition, a large number of costly dams, embankments and culverts would be required. The standard pattern in a Dutch river-clay region is therefore dominated by the motif of road-watercourse-road (Fig. 3).

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[3]) The system of watercourses can also undoubtedly have a decisive effect on the pattern of the consolidation plan. This, however, is very much dependent on greatly varying topographical conditions, and has therefore largely been left out of consideration in the present article when making comparisons on an international level.

FIG. 2a LAND CONSOLIDATION IN SWITZERLAND. DETAIL OF CONSOLIDATION AREA SAVOGNIN, OLD SITUATION.

FIG. 2b IDEM, NEW SITUATION. ROADS ALONG THE CONTOUR LINES.

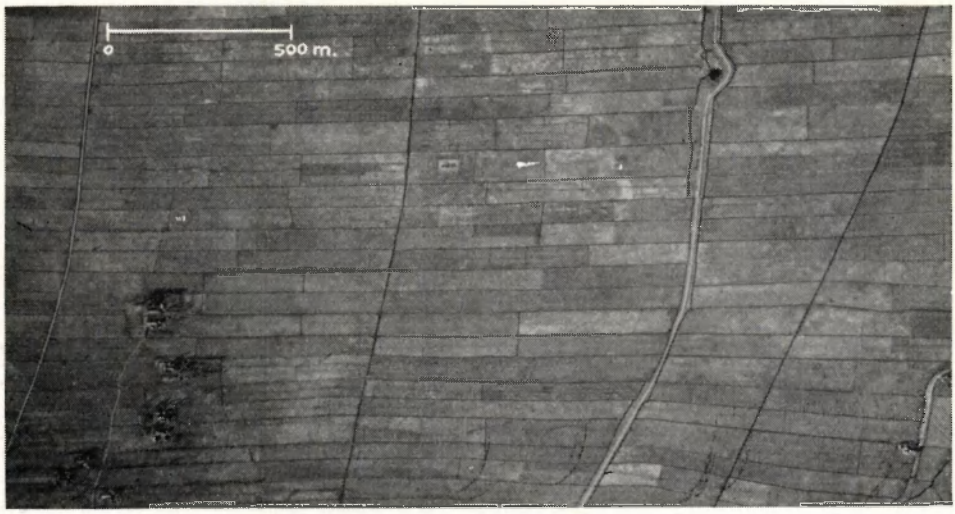

FIG. 3 PATTERN OF LAND CONSOLIDATION IN A DUTCH RIVERCLAY REGION (BASIN OF THE RIVER IJSSEL NEAR ZWOLLE) : ROAD — WATERCOURSE — ROAD.

(KLM-Aerophoto)

Table 3 The road system.

	Bavaria	Switzerland	France	The Netherlands	Sweden
Length of road in m/ha (new situation) . .	60–100	80–125	20–30	20–60	40–50
Each field bordered by one road?	rarely	rarely	sometimes	always	always
Each field bordered by two roads?	almost always	almost always	preferably	never a basic principle	never a basic principle

Generally speaking, the flat regions of the Netherlands lend themselves to application of a simple, effective system of roads, owing to the uncomplicated topographical structure of these regions.

It is only possible to design a road system of maximum efficiency for a consolidation plan in which the farmsteads are functionally projected in the middle of the land belonging to them. One may expect that replacement of farmhouses will effect a certain saving in the required length of road. This, however, results only when plots are pieced together to the very utmost extent. If concessions are made to the desire to retain a certain amount of scattered property, relocation of farmhouses cannot be expected to produce a favourable effect on the road system.

In conclusion, the density of the road network is closely dependent on the size of the farms.

If, therefore the size of the farms can be increased on a rather generous scale, it will usually be possible to economize somewhat in the length of the new road system.

In the Netherlands it is generally practicable, in carrying out a modern consolidation programme, to make do with a road network of not more than 35 metres per hectare, even in a region containing a fairly large number of small farms (about 10 hectares each).

The road system is an extremely important element in any consolidation plan. It has a decisive effect on both the new landscape and the exploitation of the farms in it; moreover it forms no small part of the cost of the plan. In all countries one may observe a logical trend of development: increasing mechanization and, in particular, motorized transport, demand good, broad and preferably metalled roads. The tendency is therefore in the direction of a less dense road network but more solid, better road construction.

Speed of consolidation programmes

In practically no land are consolidation programmes being carried out fast enough.

Sweden – and Denmark too, for that matter – proves to have largely completed its task in this sphere: three-quarters of the area of agricultural land has already been the object of a consolidation programme. However, it will be found necessary to review the situation yet again in some districts. This also applies to other countries. Development of knowledge and technique in the field of land improvement has taken place so rapidly in our century that, in Germany and the Netherlands, for instance, consideration is being given to the possibility of tackling certain pre-war consolidation schemes afresh, but in a wider context this time, and in a modern way.

Table 4 a) Area undergoing consolidation, on which work is already completed (w.a.c.) or still in progress (s.i.p.), expressed as a percentage of the total area of crop land.
b) Area fully consolidated each year.

	Bavaria	Switzerland	France	The Netherlands	Sweden [1]
a) w.a.c. + s.i.p. (%)	17	15	7	10	75
b) Total area consolidated each year, in thousands of hectares	60	5–10	300–400	10–15	2.5

[1] The Swedish figures apply only to arable and pasture land. Consolidation of forest holdings is also in full swing: 23,000 hectares are dealt with every year!

As can be seen from the table, France has recently embarked upon a very extensive programme. With this, the country takes a course that, largely speaking, lies in the direction of the accelerated solution described above, which includes little if any work in the sphere of land improvement.

In the Netherlands the aim is to raise the present annual "production" figure of 10,000 hectares to 30,000 hectares within a short time.

France, Switzerland (canton of Vaud), and some parts of Bavaria have been constrained to place the emphasis on tempo; in the Netherlands, in the greater part of Switzerland, and in Sweden, the emphasis is, first and foremost, on the all-round comprehensive approach. Experts agree that too great an increase in the quantity of work carried out may affect its quality.

Another type of situation arises when the land consolidation authorities become so to speak inundated with demands on their services, and endeavours have to be made to deal first with those areas in which the need for consolidation is most pressing.

In Switzerland the urgency of a consolidation operation is judged largely on the basis of the number of fields per farm concerned.

In France the verdict on applications for consolidation is partly determined by the degree to which fields may be pieced together as a result of consolidating action.

In Western Germany and the Netherlands the question as to the necessity of consolidation programmes is, at present, investigated in detail. The scope of this investigation of urgency embraces not merely specific districts for which consolidation programmes have been applied for, but the entire country. Not only does the actual distribution of the land play a part in establishing the "urgency index", but also size of farm, type of farm, the need for improvement of the road system, water control, the need for levelling and improvement of soil profiles, while in the Netherlands, moreover, attention is given to the economic consequences of a consolidation operation, and to all kinds of social aspects of the life of the district.

Such a broadly based investigation of project areas may lead to a consolidation plan scheduled to take a number of years to carry out. If flexibly applied, this thoroughgoing system may be of use in trying to strike a balance between quantity and quality when effecting consolidation programmes.

Subsidization

For reasons which were touched upon in the Introduction, every government wishes to have a hand in bettering the standard of living of the rural population. Accordingly, in the first place the State almost everywhere bears the costs of the necessary official organization, and a large part of the administrative costs, connected with consolidation of farms. A government subsidy is also given to help defray the costs of carrying out the plans.

In various countries there is a tendency, in granting subsidies, to make distinctions according to the *radius of action* of the measures involved. Certain civil engineering works and measures are essential in any case to ensure reasonable *rural equipment* of a district. After all, the veterinary surgeon and the country parson also profit by a good road system! There is therefore a case for arguing that certain kinds of costs (in particular, those of road construction and improvement) should be entirely borne by the local, regional and national authorities. This line of reasoning maintains that provision of rural equipment is part of the normal responsibilities of a government, and should therefore be subsidized 100 %.

There are other public works whose radius of action is more restricted, e.g. tile drainage. It is considered that individuals ought to pay a considerable portion of the costs of these, since it is predominantly their personal interest which benefits by the carrying out of this type of works service.

As yet, such a distinction is seldom made in practice. Only France can be said to be clearly moving in this direction [4]). The government there sub-

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[4]) Italy also follows this system.

sidizes execution of works of public importance to an extent of 60–80 %, while works which tend more to serve private interests receive only $33^1/_3$ % subsidy. Of late, voices have also been raised in the Netherlands, asking for systematic investigation of the possibility of distributing costs between community and individual on the basis of the radius of action of the works concerned.

In the Netherlands and Switzerland, under the present subsidy system the part of the consolidation costs to be paid by the property-owner is determined by the benefit he derives from consolidation of his farm.

The value of all fields is estimated before and after consolidation; the difference between the two estimates is an expression of the benefit derived from the operation [5]).

Under Dutch conditions it has been found that private benefit, assessed on this basis, entitles the government to claim back 25 % of the costs, and 75 % subsidy is therefore customary. In Switzerland the subsidy varies from 50 to 80 %.

Bavaria and Sweden, on the other hand, manage to make do with smaller government subsidies, viz. 25 to 50 % of the costs of operations.

The costs of a land consolidation project cannot be discussed here. They depend too much on the nature and extent of the civil engineering works carried out in connection with land improvement for a fruitful comparison to be made on an international level.

International prospects

Problems of land consolidation in European countries are actually problems of agrarian reconstruction which can only be solved by a co-operation of technical, agricultural and economical considerations.

The various countries differ greatly not only as regards their topographical and agrarian structure, but also as regards the training and outlook of their rural engineers. Accordingly, international exchange of ideas is coming to be considered increasingly important for the development of the work. Land consolidation is a field of activity in which all kinds of spheres come together: land improvement, surveying, hydraulic engineering, road construction, rural engineering, etc. However, international organizations of experts in these technical spheres are already in existence. There is therefore no need whatever for a new specialist organization to promote development of consolidation technique; there is more of a demand for a *forum* in which subject matter for study, maps and results can be exchanged, and in which new departures can be discussed.

Obviously this forum will be formed within the framework of the European Committee for Agriculture (ECA) of the FAO, which caused a working party of experts on consolidation to assemble in Rome in 1953 and recently in February 1956 in Lisbon.

The organization can be represented diagrammatically as follows.

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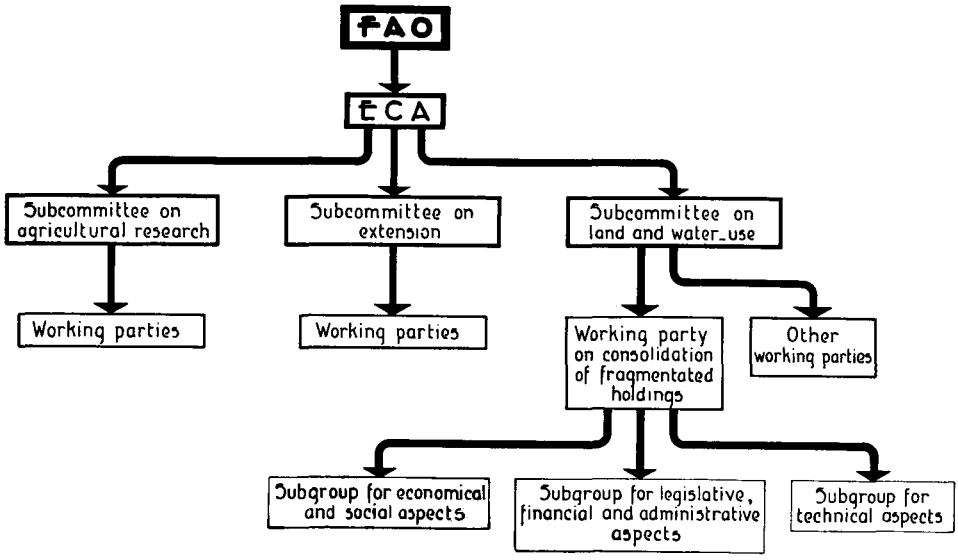
[5]) The Dutch method differs somewhat from the Swiss one as regards the mode of determining the benefit and the system of allocating the costs.



Actually every subgroup will carry out studies of past work and recommendations for future research. Especially the evolution mentioned above, will be the object of the working party.

The subgroup for economical and social aspects will try among others to establish *principles* for the determination of economical farm sizes.

The subgroup for technical aspects will deal with the determination of project areas. Furthermore studies are intended for the planning of the road net with special regard to the impact of replacement of farmhouses on the density of the road system.

The grouping together of activities would seem to guarantee a high degree of co-ordination within the ECA and satisfactory co-operation with the existing international specialist organizations.

BIBLIOGRAPHY

GAMPERL, H. : Die Flurbereinigung im westlichen Europa. 345 pp., Munich, 1955.

INTERNATIONAL JOURNAL OF AGRARIAN AFFAIRS : The consolidation of farms in six countries of western Europe. Vol. I, No. 4, 1952.

KORTE, H. C. P. : Die Flurbereinigung im West-Europa. *Agrarpolitische Revue* 9 (1952), 37–65.

MYRBECK, K. D. : Jordbruksplanering. *Svensk Lantmäteritidskrift* (1951), 20–32.

WELLING, F. : Flurzersplitterung und Flurbereinigung im nordlichen und westlichen Europa. *Schriftenreihe für Flurbereiningung,* Heft 6, 81 pp., Stuttgart, 1955.