A NEW SYSTEM OF FARM ACCOUNTING

A. L. Jolly
Imperial College of Tropical Agriculture, Trinidad

Little progress has been made in the practical application of orthodox accounting to the farm. The trend in farm bookkeeping today is for more farm records and more "simplified" account books. The word "account" is purposely written in italics because the majority of simplified account books are more in the nature of record books than books for orthodox accounting; in these books the expenditure and income under various headings are not arrived at by checking back to cash and credit purchases and sales as in orthodox accounting.

Accounting proper has developed little on the farm from a combination of two causes: first, conventional accounting is a special and somewhat laborious process and requires a degree of clerical skill not usually available on the farm; second, farm management economists have stressed the value of cost and other complicated accounts designed mainly to present agricultural information without stressing sufficiently the value of all accounting. The combination of these two causes has led to the position that only the few farmers who can employ an adequate office staff can hope to keep complicated accounts successfully by conventional methods.

Actually, accounts far less complicated than costings can be most valuable to the farmer in operating his farm, not perhaps in making him directly a better farmer but certainly in making him a better businessman. Accounts in business are kept and used to check wastage and to provide proven information. If wastage is liable to occur in business, wastage and misinformation are certain to arise on a farm. Indeed the process of checking facts on a farm by means of accounting should come before any but the most error-proof record keeping. For instance, a record purporting to show economical feeding of livestock has little meaning and can be downright misleading when it is based on the farmer's impressions or instructions of what is to be fed; for such a record to have any usefulness the feed consumption must be arrived at by an allocation of the total purchases. The accounting process is not carried out, as is sometimes assumed, entirely to obtain information more accurately; the detection of wastage itself corrects misconceptions about the operation of the farm and should result in more careful and busi-
nesslike operation of the section in which wastage is being detected. In short, accounts give control on the operation.

However logical and desirable it may be theoretically to develop farm bookkeeping by the development of farm accounting, the practical difficulty of clerical labour and skill still remain. The writer has devised and is testing the system of accounting described in this article in the hope of overcoming these practical difficulties. The reader may obtain the initial impression that the system as described would be beyond the grasp of any farmer; this impression is created by the fact that at this stage it is desirable to explain the principles of the system without illustrating all the applications of any particular principle. Indeed this article is not intended for the farmer but for the farm management economist who is always faced with the unsatisfactory state of most farmers' books. Research on the system by the economist will determine how best the system can be installed and developed on a particular farm.

Elements of the System

The system consists essentially of double entry accounting on statistical cards. In place of the conventional double entry procedure of entering the value of a transaction in both the appropriate accounts, on the card the value is entered once and the two accounts are identified. The visual comparison of conventional double entry posting and the same transaction entered on a card is given in Figure 1. It will be seen that on the card the convention is adopted of entering the account that would carry the debit entry on the left hand, debit side, of the card; the account that would carry the credit entry on the credit side of the card. All transactions therefore move across the card from right to left. It has already been proved that persons with no experience of double entry bookkeeping quickly become accustomed to the value movement on the card and to the fact that every transaction is a movement of value.

The cards are perforated round the edge to permit clipping and sorting. Clipping is effected by a simple hand punch that cuts a V-shaped slot in place of the perforation. The cards are sorted by inserting a needle, similar to a knitting needle, through the perforations. On raising the cards and shaking them gently, those clipped for the code sorted fall out. This sorting system is at present protected by patents and is fully described in leaflets issued by the
FIG. 1. COMPARISON OF CARD AND LEDGER ACCOUNTS. N.B. Not drawn in proportion: the card measures approximately 3" × 5".
manufacturers. Cards can be made to any size and design, in various weights, and in seven different colours.

This sorting system is particularly suitable for farm accounts because unlike punch card systems the cost of operating equipment is negligible. Apart from the cards themselves, the equipment for handling them (1 hand clip and 1 needle), can be obtained for less than $3. Although the sorting procedure is not mechanical and human error is possible, the clippings on the perimeter of the card give a visible check on the accuracy of any sorting or classification (Figure 2). This visible check makes it usually unnecessary to needle-sort every card from a classified file to obtain any particular group or range of transactions; an initial selection of some sections can be made by eye.

The essence of the card is therefore the single entry of value and
### Fig. 3. The Totals Book

<table>
<thead>
<tr>
<th>DR</th>
<th>Moanures 5</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period Ending</strong></td>
<td><strong>No. of Cards</strong></td>
<td><strong>Value on Cards</strong></td>
</tr>
<tr>
<td>31/1</td>
<td>1</td>
<td>104.60</td>
</tr>
<tr>
<td>28/2</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>31/3</td>
<td>10</td>
<td>56.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
of the two accounts concerned in the transaction. When a card has been clipped, the bookkeeping theoretically is complete; for instance, to obtain cash purchases, sort all cards for Cash on the credit side and total the amounts on the cards. If it is required to analyze these purchases, sort them by the Debtor side and total each component heap. In practice, however, some form of control is required to reconcile accounts and to prevent mis-sorting or mis-adding of cards. Control is achieved by a Totals Book (Figure 3). This book takes the form of a ledger in carrying accounts with Debit and Credit entries. As the name implies, these entries represent the total amounts on cards of that entry for the appropriate period. The Totals Book is entered by sorting all the cards for a period by, say, Debit side and entering the total of each account pile on the left-hand page of the appropriate account in the Totals Book; when all groups have been totalled, the cards are re-sorted by the Credit side and the corresponding Credit entries made in the book. The Debit entries are then totalled from the book and entered in a final Totals Account, similarly Credit entries. The Totals Account must, of course, balance exactly since it represents the total of the group of cards for the period added twice over. It will be seen that the number of cards is also entered in the Totals Book; the reason is that in any subsequent analysis the sorting can be much more readily checked by counting the number of cards than by totalling the amounts. The number of cards on both sides of the Totals Account must also always balance.

The Totals Book serves as a necessary control but it provides evidence of correct reconciliation and a potentially valuable summary on the progress of accounts; cumulative totals are entered alongside period totals to indicate progress clearly.

Advantages of the System

Before confusing principles by describing some of the refinements of the system it is desirable to point out some of its advantages. Advantages arise from the facts that the system is essentially double entry accounting and that it makes use of sortable cards.

The inherent advantage of double entry accounting, that is the tracing of transactions directly from the known facts of purchases and sales, is, of course, retained in the card system. An additional advantage that is also retained is flexibility. Flexibility in accounts is required so that when control over certain sections is obtained
Fig. 4. Tracing transactions through four accounts.
and the good management of that section becomes correspondingly easier, new accounts to give checks on other sections can be introduced. As control over the financial and then the business sides of a farm is achieved, new accounts will concern more agricultural details. These agricultural details can and should be entered within the accounting framework so that all information is available from one uniform source and all information is subjected to uniform checking. As an example, there is no essential difference between the service of a cow and the purchase of feeding stuffs; both and all other agricultural details worth the work can be entered in the card system.

The cards themselves have the advantage of eliminating ledger posting and other processes of digesting the original entries to make them suitable for final entry. All such processes demand clerical labour and skill without which the reconciliation of accounts becomes a hopelessly difficult undertaking. On the card the whole of the information of the original entry, including quantity, quality, price, conditions and even comments, can be entered and is thus always available by a single reference. In book accounts such information can only be laboriously extracted by cross reference to subsidiary books.

The cards lend themselves to tracing transactions through more than two accounts. Suppose, for example, in order to check feeding stuffs which are purchased in bulk and mixed on the farm into rations a system of keeping a "Feed Mixing" and a "Rations" account was maintained. Transactions can be traced from the original supply to the final ration as shown in Figure 4.

Cards eliminate tabulation. Complicated tabulation to accumulate the number of small transactions to a postable total requires clerical skill to enter and check. With the cards any particular group or field of transactions can be segregated and entered or examined without any confusion of adjoining columns or lines. Thus, the entering and checking of such transactions is easier on cards than in tables.

The sortability of cards makes it possible to use an individual card in every analysis to which it applies without abstracting or in other ways transcribing the entry to other books. For instance a card representing the milk yield of an individual cow for a month can be used by amalgamation with other cards for the rest of the herd to obtain the herd production for the month which will be
<table>
<thead>
<tr>
<th>Period Ending</th>
<th>By Totals</th>
<th>By Book</th>
<th>By Cards</th>
<th>Period Ending</th>
<th>By Totals</th>
<th>By Book</th>
<th>By Cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/1/1</td>
<td>89</td>
<td>89</td>
<td></td>
<td>3/1/1</td>
<td>67</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>2/8/2</td>
<td>78</td>
<td>78</td>
<td></td>
<td>2/8/2</td>
<td>51</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>3/1/3</td>
<td>104</td>
<td>104</td>
<td></td>
<td>3/1/3</td>
<td>86</td>
<td>86</td>
<td></td>
</tr>
</tbody>
</table>
checked against the disposal of milk for that period. The same card can be amalgamated with all other yield cards for the year to prepare statistics of herd performance for the year, or it can be used with other cards for that cow only to arrive at the cow’s performance for the year. By resorting, the card can be used to obtain the lactation yield of this cow to compare with other lactations of the same cow or similar lactations of other cows; by resorting again, it can be used to examine the monthly variation in production of all cows or of cows that have calved about the same time of the year or cows of similar age or breeding; by resorting, the card can be used in analyses of monthly production of milk to compare similar months in previous years for this or other cows; and so on. All these analyses can be obtained without any written tabulation whatever, but merely by sorting cards into groups and adding each group. In fact once the information has been clipped on the card it becomes permanently available to be used in every possible statistical context.

Refinements in the Card

(a) Clipping

The fact that Account perforations are numbered 1–9 does not imply that a maximum of only 9 accounts is possible. By coding Accounts with one or more clippings vastly more alternatives are available. It has been found that more than 4 clippings to code an account is undesirable as being difficult to carry mentally from an index to the card. With no more than 4 clippings it is possible to obtain 256 combinations of account codings from the 9 perforations! It is not suggested that any set of farm books would consist of so many accounts but the large number of alternatives allows for convenient groupings of codes; for instance Crop accounts might all commence with the prefix 1 and thus facilitate the segregation of transactions relating to crops from those relating to say livestock.

The multiple coding of Accounts makes correct entry in the Totals Book somewhat more difficult. The difficulty is not in arriving at balancing totals or of allocating large groups of cards to their correct Accounts but in allocating small groups of up to six cards when complete needle sorting appears to be unnecessary. It is very easy, for instance, supposing there are four cards clipped 7 and one clipped 7, 8, to enter all five in 7 because the group was not sorted by needle. Such errors must be prevented if the Totals Book is to be a sound control on the cards. A satisfactory auto-
matic check on this class of error can be made by constructing nine Totals Counts as shown in Figure 5. The procedure is as follows: when the Totals Book has been compiled, the number of cards on, say, the Debit side of all accounts containing the code 1 are totalled and entered in the Dr. side of the Totals Count for 1; similarly all accounts containing the code 2 are totalled and entered in the Totals Count 2. Subsequently the cards are sorted one needle at a time and the number of cards counted and entered adjoining those prepared from the Totals Book. It is unnecessary to consider money values in the Totals Count since the balancing of the Totals Book is evidence that the value of the cards has been correctly added although possibly wrongly allocated. The counting of large numbers of cards can be conveniently carried out by weighing 25 or any other convenient small number on an ordinary domestic letter weight.

(b) Details within Accounts

It will be seen in the example of a more detailed card (Figure 6) that perforations 0 to 9 appear on the right hand side of the card. These perforations are used to identify Details within Accounts. By
the use of Details it is possible to introduce a sub-classification within the Accounts. This principle of having two levels for allocating transactions, first in the broad Account groups and second, in the Detail groups, is an integral feature of the system because it has definite advantages over the one level system of allocation.

The first advantage is that it is possible to have a Totals Book (being divided by Accounts only) which is a summary check on a period of transactions and not the laboriously elaborate abstract of the whole allocation information on the cards; a Totals Book that contained a separate page for every detail within every Account would be so voluminous in even a moderately complicated set of accounts as to be unmanageable. The second advantage of Details is that many Accounts can be amplified by means of Details with no disturbance of the original Account coding. The third is that Details facilitate correct clipping because Accounts can be clipped quite independently and in a different operation from Details; furthermore many Details are common to more than one Account (for instance classes of cultural operations on all arable crops) so that Details clippings can remain uniform throughout all such Accounts.

Since each card carries two Accounts, the Details range tends generally to be split into two groups: one group for instance, 4 to 0 referring to one Account and 5 to 9 referring to the other, each having 31 alternative clippings. Some ingenuity has to be exercised in deciding Details codings so that transactions do not occur between Accounts that both have the same Details range. If it is impossible to avoid duplication of Details clippings with certain transactions that are fairly common two possibilities are available: (1) to split one of the Accounts into separate Accounts for each Detail; (2) to use the other Details clippings a, b, c, d (16 combinations) for recording the Details in one of the Accounts. If duplication arises only occasionally with an unusual transaction it is possible to split the transaction between two cards using a dummy Divisions or Transfers Account.

(c) Date, Serial Number, Etc.

The card carries a clipping for the date of the transaction so that cards can be needle sorted into the totalling periods to which they belong. If the totalling period is one month the month clipping as
shown in Figure 6 is sufficient. It will be seen from the figure that the month is clipped factorially; for example, May, month 5, is clipped 4, 1. This factorial system of clipping economizes in perforations and with a little practice becomes second nature to the operator.

The serial number clipping along the base of the card need be of little concern to the user of the card since series of cards can be precollapsed before being issued. The object of such clipping is merely to protect against loss or theft of cards and to facilitate the detection of such loss. The clipping makes it possible to trace the actual number of the card lost which no doubt would give a clue to the date and nature of the transaction from the contiguous cards; the clipping, of course, also prevents alteration in the printed serial number of the card.

Because it is necessary to account for the whole supply of cards used it is not permissible to destroy a card on which some error has been made. The standard method of cancelling a faulty card is shown in Figure 7. A “Cancelled” account should appear in the Totals Book recording these transactions in the same way as any other.
(d) Cumulative Cards

It is possible to accumulate a number of small repetitive transactions on a card of the type shown in Figure 8. Such accumulation is desirable for these transactions in economizing in the consumption of cards and the entering and clipping of them. It must, however, be realized that cumulative cards require more skill in entering than the simple one entry card. Cumulative cards are in fact simple tabular statements and have the disadvantages of tabulation.

The period of accumulation for this type of card should be the natural period for the transaction concerned; transactions connected with sales or purchases can be best accumulated on a month card since billing is normally monthly; transactions relating to wages should be accumulated on weekly cards if labour is paid weekly.

Many cumulative cards gain in usefulness if they can be displayed and entered upon a board. A plywood board carrying rows of short cabinet tacks at suitable intervals to hang the cards by their perforations is suitable. A more flexible board used by the writer consists of overlapping plywood slats carrying nails along the edge; the overlapping slats prevent the cards from being blown
off while allowing the easy removal and re-arrangement of the display. A display board gives a visual representation of the phase of operation of the farm shown by the daily accumulation and facilitates the correlation of associate transactions. For instance, in a labour display the operation of applying manure suggests a card for the issue of manure; or in a milk production display, a card showing a cow coming into milk suggests one for the birth of a calf. The daily entry of quantities on these cumulative cards also draws attention to daily variation which may be of great importance.

Checks on the daily entries on the cumulative cards are made possible by entering alternately in red and black ink; with such alteration it is possible to arrive at daily totals direct from the display board with reasonable accuracy. The use of different coloured cards assists in carrying the eye down the appropriate columns and also facilitates accurate checking.

(e) Summary of Cards

Many cards require little or no written explanation of the transaction they represent, and the body of the card can be used for summarizing past transactions concerning that particular Account or particular Detail. Valuation cards are particularly useful in this respect. For instance, Figure 9 shows a valuation card for an individual cow with her past lactation records entered upon it. A

![Fig. 9. Summary (on closing valuation) card](https://academic.oup.com/ajae/article-abstract/30/3/500/68756/1030068756)
group of such cards for the whole herd can be filed perhaps in order of merit so that the farmer can have the latest assessment of the efficiency of the individual cows always at his finger tips. It may be noted that all the information summarized has, of course, already been recorded on various transaction cards. Lactation or any other records are in fact a summary of certain card transactions which will certainly be required in some standard form.

A rather different but equally useful summary concerns balances. The normal procedure of recording a balance is by using a Balances Account as shown in Figure 9; it is necessary, however, to use two cards, one for the closing balance as in Figure 9 and a similar one with the accounts reversed for the same balance opening the new period. This procedure is satisfactory in recording valuations and striking Balances that have to be carried from the end of one financial year to the beginning of the next, but it is objectionable as being wasteful of cards and work when a balance is struck during the year and particularly when it represents merely a book balance and not actually a stocktaking. It is convenient, therefore, whenever book balances are struck to record this balance not as a transaction but in the body of a balance card recording an actual stocktaking.

(f) Labour Saving

Cards permit labour saving from the fact that they can be kept available at the most convenient points on the farm and that they require no fine hand writing for the first entry. An example of having cards readily available is in the Cash Box; if cards are kept in the box, preferably different colours for receipts and withdrawals, and preferably prestamped and preclipped Dr. Cash and Cr. Cash respectively, the labour of entry is small. An entry written in pencil on the body of the card, for instance, "Curry Combs $4.60" is sufficient to identify the transaction. Another possibility of having cards available is for the farmer to carry a loose leaf notebook with filing rings suitable for the card perforations; he can then jot down diary fashion any transaction or other matters as and when they occur to him.

Cards can sometimes be used for automatic stock checks; they can be pre-stamped and pre-clipped for convenient quantities of supplies and can be filed in the store room as supplies are received. When supplies are issued from the store an equivalent number of
cards are withdrawn and either entered with the account to be charged or deposited in another container representing that particular account. A similar system can be applied to livestock by using valuation cards as counters for individual animals; these cards can be filed or displayed probably in the farm office in such a way as to indicate the position and condition of every animal; for instance, suckling sows can appear in one section, dry sows in another, fattening pigs in another, and so on. An automatic check is thereby kept on stock numbers and movements with very little labour; this check facilitates the calculation of rations, arrangement of services, etc.

Labour can also be reduced by using duplicate books for various purposes bound in such a way to give a carbon copy on the card. Such books can be used for check books, receipt books, sales slip books, etc.; the process of making out the original document suffices to give all the required information for clipping the appropriate card. On large farms employing much labour for which there is considerable delegation of authority the duplicate book system can easily be applied to issuing and recording written orders.

**Conclusion**

An attempt is made in this article to outline the principles of the clip-card system of accounts as applied to farms. It will be appreciated that it is impossible to describe much of the detailed application of such a flexible system to various types of farms. Every farm and every farmer require a different framework of accounts if the maximum benefit is to accrue from the minimum accounting labour. The writer's experience of the system so far has, however, led to some general conclusions.

It appears that any transaction worth noting can be entered in a uniform way on the cards. It does not matter whether the transaction concerns the outside world or whether it is a purely domestic transfer on the farm; neither does it matter whether the transaction is of a determinable value or whether it is to be valued on some arbitrary basis. All transactions can be entered on cards and are more explicit and uniform for being so entered.

Indeed an obvious result of the use of the card system is the more precise appraisal of transactions. Every card demands clear cut decisions; from the diary entry on the body of the card, the card clippings have to be decided and a clipping is either yes or no with
no middle course. An accumulation of these enforced decisions results in more precise distinction being made in the classification of transactions.

Due no doubt to the increase in precision of appraising transactions it is found that the user of the cards becomes more critical of established procedure on the farm. Methods which without special thought seemed normal and efficient often appear most unbusiness-like when translated into card transactions. It has happened that to make an operation convenient for entering on cards a change in procedure on the farm is desirable; it then becomes obvious that the new procedure is far better management than the old.

One difficulty experienced with the system is that the scope is so wide and the possible useful applications on a particular farm so numerous that there is the temptation to undertake too much detail at the outset. The success of any system will depend on keeping the scope at all times restricted so that the farmer has complete control over the accounts he is keeping. If a simple set of accounts arouses the farmer's interest in accounting and stimulates his critical appraisal of his farm and business management, a solid foundation is then laid for accounts of slowly increasing complexity.