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Review article / Revue critique

Revising the National Accounts

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In late 1975, Statistics Canada published the long-awaited documentation on the most recent revision of the National Income and Expenditure Accounts, the core of Canada's System of National Accounts. The three-volume *National Income and Expenditure Accounts* is eleven hundred pages long. The first two volumes present the data on an annual (Vol. 1) and quarterly (Vol. 2) basis. The third volume, *A Guide to the National Income and Expenditure Accounts (Definitions – Concepts – Sources – Methods)* provides the basis for our review.

It is not our intention to provide a detailed discussion of the four-hundred-page *Guide*. We will concentrate our attention on the changes that have been made and on our thoughts about the current status of the Accounts from the perspective of economic analysis. After a brief overview, the changes in the Accounts will be discussed, followed by some specific comments on sectoring. A final section will discuss reform proposals.

On the whole, the *Guide* is an excellent description of the Accounts. As a basic reference document it provides quite detailed coverage of the concepts, methods, and sources. For those interested in more detail the informal procedures of contacting the relevant individuals in Ottawa will still be required. Chapters 1 to 11 and 14 contain material very similar to that contained in the old 'Brown Book' (Dominion Bureau of Statistics, 1958). Chapter 12, on linkages to the rest of the System of National Accounts, and chapter 13, on international comparisons of accounts, are new. The final two chapters discuss the quarterly Accounts. The quarterly estimates will not be discussed in this review.

The inclusion of all this material in one volume has made the price, \$6.75, moderately high. Statistics Canada should consider publishing a portion of the *Guide* at a lower price for use in macroeconomics courses. The current price and size is inappropriate for the student market.

The arrangement of the tables in Volume 1 is unfortunate. A given table appears in three different places with one hundred pages between each appearance. This strange layout is not explained and is certainly inconvenient

unless one is interested in the particular time periods chosen. (Statistics Canada might consider adding the last of the three sections to the abbreviated student *Guide* mentioned directly above.)

Before turning to a more detailed consideration of the changes in the Accounts, a brief analysis of the general status of national accounts may be useful. The purposes of the accounts have always been stated rather broadly. In their recent book the Ruggleses (1970) state: 'National economic accounting has as its prime objective the creation of an information framework suitable for analyzing the operations of the economic system'. Later, they say: 'The adequacy of a given national accounting framework should be judged by (1) whether it can provide the basic information required for the major classes of economic models and (2) whether it can avoid presenting information not required for any reasonable economic model' (2). These broad requirements provide a general framework for discussing the revisions to the Accounts. There will be substantial room for disagreement about specifics.¹

It is our strongly held impression that the purposes of the Accounts are changing and expanding. The demands for and attempts by the government to ensure 'good' economic performance are creating continuous pressure for more and better data. This often means a proliferation of detail through disaggregation by various characteristics of transactions, e.g. geography, commodity, industry, and sector. The System of National Accounts developed in Canada, with detailed input-output tables and financial flows in addition to and linked to the national income and expenditure accounts discussed here, is a response to this increased concern. The increased demands of users and the information-processing capabilities of computers make it difficult to evaluate the National Accounts independently of other more disaggregated economic statistics.²

National income and expenditure accounts were developed as a response to the needs of policy-makers using a Keynesian framework of analysis. A steady movement has taken place away from the idea that there is a different and satisfactory macroeconomic theory, towards the neoclassical position of developing theory from the maximizing behaviour of individuals. The development of macroeconomic theory, as opposed to empirical macroeconomic studies, has stagnated.³ In addition, the orientation of early Keynesian analysis to short-run fluctuations is being supplemented by an interest in supply problems underlying questions of growth and structural change. The data requirements of a resurgent neoclassical analysis are likely

1 In developing the details of their recommended accounts, the Ruggleses make more concrete this description of their purpose.

2 The comments below on the UN accounts and the criticism by the Ruggleses of these accounts (1970, 22-9) are an example of this problem.

3 Monetary theory as distinct from macroeconomic theory is developing.

to be more extensive than those suitable for short-run aggregate demand models.

These changes make it difficult at this time to know exactly what sort of national accounts might be most useful. Moreover, the development of a more satisfactory policy model of the role of government in the economic system, while progressing, has not arrived at a degree of uniformity adequate for providing a guide to the statistics on government which should be incorporated into the National Accounts. This limitation should be kept in mind when considering reforms of the accounts.

CHANGES IN THE ACCOUNTS

There are few major changes in the Accounts, and comments in this section will focus on the main revisions that have been made. An overwhelming proportion of the changes are related to transactions involving the government sector and transactions that are transfers. Many of them are simply corrections of short-cuts initially used because of data limitations in areas where the resulting small errors were not thought to be serious. None of these fundamentally alter the old framework for the Accounts, although they do provide cumulative improvements.

In the government sector, the investment income of the government is altered by excluding the investment income of the trustee pension plans of government employees and the unremitted portion of government business enterprise profits. The income of the provincial liquor commissions is finally recognized as indirect taxation and not government business enterprise income. Royalties from natural resources are now included as investment income rather than as indirect taxes. Several of the above revisions affect the treatment of government business enterprises (e.g. provincial liquor boards), the CBC has been shifted from general government to government enterprises, and municipal waterworks have moved in the opposite direction.

The area of transfers has been substantially improved through the explicit recognition of transfers to and from the non-resident sector from all other sectors, the use of transfers to handle 'bad debts' between sectors, and the introduction of a transfer payment from the household to the corporate sector covering the non-productive portion of the interest on consumer debt.

Capital formation and consumption have undergone several changes in the new accounts. Government expenditure on buildings, equipment, engineering structures, and inventory changes are now shown explicitly as investment, and government saving (defined analogously to saving in other sectors) is now provided. This is a long overdue and welcome change. Defence outlays are still correctly treated as a current expenditure.

Unfortunately, the imputed rent on government buildings has been eliminated. While it is obvious that difficulties exist in evaluating the services

of the government capital stock, these do not justify the exclusion suggested in the revision. At present the services of government capital are valued in terms of depreciation only. The latter are derived from the Construction Division's estimates of the capital stock. The inclusion of the opportunity cost of holding such a stock as measured by the forgone yield on, say, bonds would be an improvement and a step in the direction of providing an estimate of the rental value of the stock.

The transfer costs on the sale and purchase of existing assets are now included in the estimates of capital formation. This accords with United Nations recommendations and common business practice, but it creates difficulties for the measurement of additions to the net stock of capital goods. The net stock is not increased by such transfer costs. (There is not a corresponding increase in the flow of future income from the good.) Hence, if the magnitude of such transfer costs were provided, it would facilitate correct measurement of the net capital stock. There are a range of investment expenditures (under the correct definition) that also need more careful attention. Installation and preparation expenses for machinery and construction are the most important. Theoretically these should be written off in the first year, along with transfer costs. Some notion of the magnitude of these items in total investment would be helpful.

Since 1949, changes in the tax law for corporations have increased consumption allowances based on taxation data relative to depreciation on the books of companies. Depreciation, formerly based on the tax data, now will be derived from company reports of their own depreciation. The shift to book depreciation on assets is probably not very useful. While the tax system has made depreciation for taxation purposes larger than economic depreciation, the accounting rules of firms vary widely and do not approximate an economic theory of depreciation. Since the new estimates of government capital depreciation are derived from estimates of the government capital stock, it is not clear why a similar procedure cannot be followed in the private sector. Finally, information on the tax depreciation data should be included in the Accounts since it is relevant information upon which firms make decisions.

Because of the variability of the product, the design of price indexes for the construction industry has been difficult. In an attempt to overcome the limitations of using cost data, Statistics Canada has built up an index combining cost data supplemented by information on productivity and changes in profit margins. It is important that these changes be discussed by economists because they are examples of attempts to construct information that corresponds to economic concepts when direct observations on this information are costly if not impossible to obtain. Many, if not all, of the reforms under current consideration involve similar problems of information-construction where direct information is missing.

The adjustment of the construction price index is an example of the difficulties of valuing products when price data are unavailable. The imaginative construction of data is likely to become more extensive. The construction of the price index is covered in the January, July, and November 1970 issues of the *Canadian Statistical Review*. There are a number of well-known limitations to the technique, and space limitations prevent more than an indication of the sources of the problems. The index remains a cost index, but it is adjusted through increases in labour productivity and in a profit margin. Unfortunately the productivity adjustment is applied only to labour, and its calculation involves the assumption that output and materials input are always used in fixed proportion. While this might be true for a given technology, it is presumably not true with technical change, nor are the boundaries of the construction industry sufficiently well defined to prevent increased prefabrication from altering the ratio of materials to output, even with a given technology. The profit margin index is derived from the ratio of value added minus labour costs to the value of total output. The old cost indexes based on material and labour inputs completely excluded the substitution of capital for either of these inputs both on the job and through more factory processing. The increased use of capital inputs on the job suggests that they were less expensive and the old price index was biased upwards due to the wrong weights given to the labour and material inputs. The effects of the new techniques for calculating construction price indexes is to reduce substantially the rate of increase of prices in this sector. The old price indexes did overestimate price increases, but until more information is available on either output quantity or price it will be impossible to know what errors remain. Statistics Canada is involved in several projects to test alternative methods. The imperfections of the new method, while serious, may still be an improvement on the old.

The new Accounts incorporate a large number of statistical revisions. The new information from the censuses and other sources were incorporated in two stages. The 1961 Census data were incorporated into the interim report *National Income and Expenditure Accounts, 1926–1968* (1969), the ‘Green Book.’ Additional information which became available after 1969 (such as the 1966 Census data) was incorporated in the present volumes, but these revisions were only carried back to 1947. Hence there is a break in the series between 1946 and 1947. No indication is given that work is proceeding to eliminate this break. If not, this is most unfortunate, since studies of economic growth should be based on as long a time series as is possible. Alternatively, it would be useful if Statistics Canada would maintain the Green Book data for 1947–68. Users could then attempt to adjust the data from 1926 to 1946 based on the two sets of data from 1947 to 1968.

Chapter 2 provides an excellent discussion of the effects of the revisions. Unfortunately the sources for them are often imprecise, and the method of

extrapolating them backwards is not discussed. The revisions have increased the level and rates of growth of the major aggregates. The largest changes are in wages and salaries, corporation profits, and personal consumption expenditure. The statistical changes dominate any effects of the definitional changes. While revisions will always be unavoidable, it might have been useful to know if the current revisions were unusually large. One would hope that the effects of periodic censuses could be minimized in the future as improved annual data became available.

SECTORS AND STRUCTURING OF ECONOMIC ACTIVITIES

The constituent parts of the System of National Accounts are: 1/ the National Income and Expenditure Accounts, 2/ the Balance of International Payments accounts, 3/ the Financial Flow Accounts, 4/ the Real Domestic Product by Industry indexes, 5/ the Productivity indexes, and 6/ the Input-output tables. One of the principal advantages of a centralized statistical agency is its capacity to enforce uniformity of concept, definition, and classification across different areas of statistical development. With this objective in mind Statistics Canada has introduced modifications to the structure of the National Income and Expenditure Accounts to improve the linkages to the Input-output tables and to the Financial Flow Accounts. The new structure of the Income and Expenditure Accounts is shown by Figure 1 (reproduced from the *Guide*, 105).

The consolidated production account provides a sectoral breakdown of final sales adding up to gross domestic product at market prices – the aggregate to which the components of final demand in the Input-output tables sum. The sectoral capital finance accounts (which show the saving and capital formation of each sector) provide the linkage to the Financial Flow Accounts. The changed structure also moves the Accounts closer to the United Nations System of National Accounts (1968), so that international comparisons are facilitated.

The degree of linkage between the different parts of the System of National Accounts is not as well developed as the *Guide* suggests. A prime area for further work is in strengthening these linkages to enable the System actually to be used as a system.

There is no sector in which production for sale in the market sector of the economy is separated from production in the personal and government sectors, whereas, in the real domestic product and productivity indexes, output of the 'commercial sector' is shown as a separate aggregate. In an integrated system of accounts, one would expect to find a corresponding commercial (or business) sector in the National Income and Expenditure Accounts in which the production and capital formation activities of transactors who behave as if they maximize profits are aggregated. The produc-

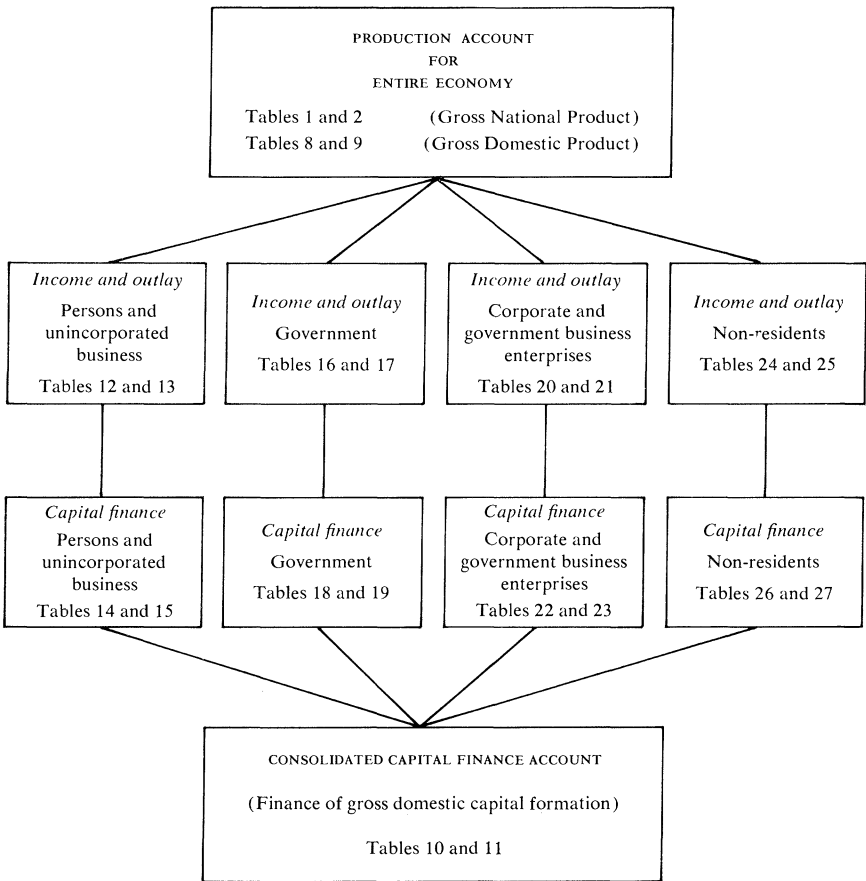


FIGURE 1 The Canadian system of national income and expenditure accounts (Source: Statistics Canada, 1975, Vol. 3, 105)

tion and capital formation of households and governments belong in separate sectors.

The rigidity of any *consistent* accounting framework requires considerable loss of information that is available but does not fit the structure. For example, the United States accounts have developed a series of separate tables,⁴ not fully integrated into the accounting system, showing important areas of the economy more concretely and introducing more supply-side information. The major examples are gross corporate, farm, and auto product, and GNP by product, purchaser, and sector. The information contained in these tables has been favourably received and is an improvement that Canada should consider. In general, it is a part of the pragmatic commitment of American national accountants and economists to the development of

4 These are tables 1.3–1.8 and 1.14–1.18 in Office of Business Economics (1966).

accounts which are of immediate practical interest without regard to their full integration into a consistent accounting scheme. The anniversary issue of the *Survey of Current Business* (Office of Business Economics, 1971) provides numerous examples of this, and Denison and Jaszi are particularly forthright. Statistics Canada should consider the publication of other special and informative tables even if they do not fit the accounting system.

FURTHER DEVELOPMENT

The new Canadian Accounts are not distinguished by innovations in concept or practice. The revisions attempt to update the data base, clarify a number of sloppy practices, and provide a different (perhaps worse) format for presentation. Yet in recent years a number of interesting innovations have been suggested. No attempt at a systematic coverage will be made. The proposals discussed here were drawn from the recent work of Christensen and Jorgenson (1970a; 1970b), Ruggles and Ruggles (1970), Kendrick (1972), and a variety of authors in the anniversary issue of the *Survey of Current Business* (ibid.).⁵ We recognize that the present set of revisions to the concepts and structure of the Accounts was essentially completed by 1969. In choosing a few of these recommendations, and our choice may not satisfy everyone as the most important, we are trying to make some positive suggestions for the next round of revisions.⁶

Underlying many of these recommendations is an interest in a more comprehensive, not necessarily more detailed, understanding of the economy. There are several ways of summarizing or approaching this, of which two are fundamental. First, there is an emphasis on including more than the flow-of-income and value-of-transaction measures so prevalent in the early accounting efforts. Secondly, there is an attempt to struggle beyond the confines of the market-determined valuations to incorporate more economic activity within the measures of the national accounts. Both of these will be explored below, and they can be linked in the following manner. Economists are trying to organize a more comprehensive set of accounts with emphasis on a neoclassical economic analysis as well as a Keynesian one. This requires much more information concerning supply conditions, prices, and stocks of assets, in addition to data on values, flows, and demand. While the expansion in market data is important, there is increasing emphasis on the inadequacies of market data alone.

5 Further work by Eisner, the Ruggleses, and Kendrick are outlined in the NBER annual report (1975). To balance the academics' inherent bias towards perfection, we recommend the masterful article by Jaszi in response to the barrage of suggestions in the anniversary issue of the *Survey of Current Business* (office of Business Economics, 1971).

6 A very brief discussion of reforms appears on page 100 of the *Guide*.

The work by Christensen and Jorgenson is a portion of a large study to improve the supply-side data base. The usefulness of solely demand-determined models in directing government monetary and fiscal policy for stabilization purposes has been seriously questioned. Of more importance, an interest in growth and changes in economic structure has meant that supply conditions had to be considered more directly. While the national accounts understandably lag behind developments in economic theory, economists and other data users will continue to pressure the government to produce improved data as well as to do exploratory work. To supplement the existing data on real output and output prices, Christensen and Jorgenson have developed measures of real factor input and factor prices. This is a complement to the development by the US Bureau of Business Economics of output data organized by supply criteria. The necessity of measures of real factor inputs for complete models of the economy are straightforward. The difficulties have been and are the conceptual and practical problems of measuring output, and capital and labour inputs.⁷

Christensen and Jorgenson have provided a method of accounting for the use of capital inputs. Their methodology and data, though controversial and weak in certain aspects, are a major effort at improving our statistical data. They have further unpublished work on the stock of assets held by sectors of the economy and the valuation of these assets. Canada has lagged in developments of real factor input, although certain components of the work are well developed. There has never been sufficient integration in Canada of the labour data with the National Accounts.⁸ While impressive work has been done on estimates of the capital stock, this work has not been integrated into the System of National Accounts. Since Statistics Canada has much of the data needed for the production of real factor input for the economy, it is hoped that progress on this work will continue with greater speed. Once the National Accounts provide information on real outputs and inputs as well as on prices, the possibilities for considering a model of the economy with both demand and supply elements are enhanced.

Tied closely to the development of measures of real factor input is work on the stock of assets held by the various sectors of the economy. This will involve Flow of Funds Accounts data and some resolution of the sticky problem of the valuation of existing assets. Current prices of the existing

7 Given the recent controversies on the measurement of capital, we might quote a recent conclusion by Bliss (1975): 'While our conclusions concerning capital aggregation are very damaging for the whole idea, the investigation has provided no support whatever for the idea that the aggregation of capital is relatively difficult. The conditions for general capital aggregation are identical to the conditions for the aggregation of labour or of output.'

8 For example, no disaggregated information is presented on the quantity of labour that is consistent with the National Accounts. The productivity division substantially alters the labour income and labour quantity data before using it. However these labour series are not published.

stocks of financial and non-financial assets remain one of the most under-developed areas in Canada, as in other countries. Models of national economic behaviour for medium-term growth and structural change will depend on wealth concepts, and without adequate measures of the revaluation of assets and capital gains and losses, the data on wealth will be very imprecise.

The completion of even the tasks outlined above will require very extensive resources. With the sectors organized so that productive activity may occur in the government and household sector and with measures of assets developed, a much more comprehensive set of imputations could be made. This would require a sharp break from the traditional (based on availability of data) restriction of measuring only (with a very small number of exceptions) market transactions. Current output would include an imputation for the services of all consumer durables now treated as current expenditure⁹ and of government durables. Household capital formation would remain in the household sector, and the imputation of housing services would be part of household output and consumption. The completion of this task would ensure that the flow of services from real tangible assets, whether used for production in the enterprise sector or not, would be part of the output of the national economy.

Another aspect of adding this new dimension to the Accounts would be the further redefining of the final – intermediate product and consumption – investment division. Within the final–intermediate product dichotomy, the major change is an attempt to reassess this division within all sectors. In the business sector, some business expenses would be reallocated to final product from intermediate expenses (e.g. advertising on television, employee benefits in kind). In the government and consumption sector, final product would be reduced by an opposite shift from final products to intermediate goods. The most controversial area is in the household sector. The attempt to allocate a considerable portion of household expenditures to intermediate goods requires a redefining of the distinction between gross income and net income. It does not seem possible at this stage to decide where the dividing line in the household sector should be. The essential arbitrariness of the current distinction can be seen by the efforts to convert income into a form against which expenses can be written. However, it is not very useful to alter the national accounting definition in the household sector until more clarity and perhaps consensus exists on the objective of the distinction.

In the government sector the possibilities are much more interesting. Work should be done on attempting to present government expenditure by a classification that would at least provide information on the degree to which government expenditure is an intermediate product. This is only a

⁹ This is in line with the development of post-Keynesian consumption functions, which use concepts of permanent income and consumption. See, for example, Friedman (1957).

partial step since it would not immediately change current measures of GNP, but it would aid users who wanted to adjust the traditional concept. Perhaps more importantly, it might invigorate a range of studies on the impact of government expenditure which would clarify the difficult theoretical and empirical problems underlying any attempt at a full-scale reallocation of expenditure.

With respect to the consumption-investment dichotomy, the Ruggleses and Kendrick have both proposed that a large number of current expenditures by all sectors be considered as capital expenditures since they have a substantial impact over time. Health and education (including research) are the two largest components of developmental expenditures to be capitalized. This involves cases in which intermediate goods will be reclassified as final expenditure (e.g. training costs for business), as well as shifts of final products from consumption to investment (e.g. general public education). The effect is to move the national accounts further away from market transactions since imputations will have to be made for the flow of services yielded by these capitalized developmental expenditures as well as their value. Ultimately, the goal of some economists is the collection of data on the complete activity of the population. In simplest terms this would be a complete description of the allocation of time of all individuals to various activities. The latter would have to be described in terms of the other inputs and outputs involved during the time period. To bring these into the national accounts a vast imputation of quantities and price would be needed. This is clearly beyond any sensible program at the current time. What has been suggested by Kendrick is that certain non-market production activities be included. Primarily, this is non-market household production, such as housewives' services, volunteer labour, and students' school work. While this is much more limited than a complete time budget, it is a part of one. Basic to the controversy are not only the difficulties of measurement but also the conceptual confusion surrounding the production-consumption distinction in household non-market activity. A time budget would provide all the necessary information without initially requiring that there be an explicit separation of activities into production and consumption.

An important facet of the revival in interest in national accounts requires recognition, although we do not discuss it in detail.¹⁰ The motivation for much criticism of the National Accounts is linked to an increased concern for the misuse of GNP as a welfare indicator in the popular culture and to the search for an improved indicator of economic welfare. The most common form of this critique is linked to ecological considerations, although this is not the sole criterion. A critical component of most arguments is some non-market effect, perhaps classified as an externality, and often resulting from market failures associated with difficulties with property rights, transaction

10 For a discussion see the Statistics Canada (1974) publication by Hawrylyshyn.

costs, and public goods. In the *Survey's* anniversary issue, Okun has argued vigorously that the measurement of GNP and revisions of the National Accounts should not be motivated by welfare ecological arguments. He fears, correctly, that the notion of a single indicator for welfare, such as GNP, revised or not, is ludicrous, and that reforms motivated by welfare are likely to worsen rather than improve the usefulness of GNP.

What is needed in Canada is a debate and a series of proposals about the objectives of the national economic accounts. Following this a series of pilot projects on the feasibility of reforming major segments of the accounts should be instituted. The motivation for reform, which we believe is useful, is not linked closely with welfare. Primarily, it is the development of a more comprehensive framework for positive economic analysis. Hence the development of data on real factor usage, including government and household production, deserves priority. Non-market transactions which use resources cannot be excluded, but experimental studies of these activities should precede any attempts at full-scale development of these activities within the national accounts. The other major effort that needs substantial attention is the creation of sectoral and national balance sheets which properly account for the changing value of existing assets (i.e. capital gains and losses and for intersectoral transactions in existing assets).

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