

UNIVERSITÀ DEGLI STUDI DI PARMA
FACOLTÀ DI SCIENZE MATEMATICHE, FISICHE E NATURALI



DOTTORATO DI RICERCA IN SCIENZE DELLA TERRA
XXI CICLO

STRATIGRAFIA FISICA ED ANALISI DI FACIES DELLA FORMAZIONE
MARNOSO-ARENACEA, AFFIORANTE FRA LA VALLE SANTERNO
E LA VALLE SAVIO (LANGHIANO-SERRAVALLIANO, APPENNINO
SETTENTRIONALE, ITALIA)

Volume II
(SEZIONI STRATIGRAFICHE, SCALA 1:50)

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Breve descrizione ed ubicazione delle sezioni stratigrafiche

Il lavoro di tesi si è svolto in una area compresa tra la Val Santerno e quella del Savio negli Appennini romagnoli (Italia settentrionale) dove affiorano i depositi langhiani e serravalliani della Formazione Marnoso-arenacea (FMA) (Figs. 1 e 2). Durante il periodo di dottorato sono stati fatti 240 giorni di lavoro di terreno, gran parte dei quali passati nella FMA ma anche in varie località dell'Appennino emiliano, del Bacino Terziario Piemontese, dei Pirenei (Spagna) e delle Arenarie di Annot (Francia). Nella successione stratigrafica analizzata sono state misurate sette (7) sezioni stratigrafiche per un totale di 6.710 m metri. La successione studiata, in particolare, è compresa fra lo strato guida Io (Langhiano, vedasi Capitolo 5 Volume I) e il Sistema torbiditico di Firenzuola (Serravalliano), e si estende su una distanza di circa 60 Km in direzione grosso modo parallela alle paleocorrenti (Fig. 1 e 2). Lo spessore massimo misurato è stato di 1.923 m nella sezione B, Valle del Senio (Fig. 2).

La porzione stratigrafica della FMA presa in esame risulta particolarmente adatta a studi stratigrafici ad alta risoluzione su grande distanza, grazie ai suoi eccellenti affioramenti e alla presenza di numerosi strati guida, alcuni dei quali cartografati in dettaglio sulle carte dell'Appennino romagnolo di Cerrina Feroni *et al.* (2002), Martelli *et al.* (1994) e della Regione Toscana (scaricabili dalla rete all'indirizzo <http://www.rete.toscana.it/sett/pta/terra/geologia/>). (Fig. 2). Queste particolari condizioni sono alla base di molti studi precedenti che già si sono occupati di studi relativi a correlazioni stratali su lunga distanza. Il lavoro pionieristico in questo senso è stato sicuramente quello di Ricci Lucchi & Valmori (1980), sulla cui scia sono poi seguiti quelli più recenti di Amy & Talling (2006).

In ogni caso, oltre al lavoro effettuato nella Formazione Marnoso-arenacea sono stati misurati anche 304 m nei depositi del Sistema Banaston 1 (secondo Remacha & Fernandez, 2003), nel Gruppo di Hecho nei Pirenei centro-meridionali in Spagna.

Per quanto riguarda la valutazione delle granulometrie occorre fare alcune precisazioni. Innanzitutto durante il lavoro di campagna la granulometria è stata valutata visivamente e attraverso l'aiuto di un comparatore granulometrico manuale. Nelle facies caratterizzate da una grande variazione granulometrica, come per esempio le unità (b) a *slurry* degli strati tipo 1, è stata presa in considerazione la popolazione granulometrica maggiore. La granulometria della porzione superiore arenacea (c) degli strati tipo 1 e 2 (vedasi Volume I), invece, è stata interpretata anche in base al profilo di erosione che risalta sempre molto rispetto alla facies a *slurry* intermedia (b). In seguito alle analisi granulometriche effettuate su questi tipi di strati si è visto che la granulometria di queste porzioni superiori (c) è sempre minore rispetto alle porzioni intermedie (b) e basali (a). In questo

modo, le unità (c) di alcuni strati tipo 1 e 2 possono essere state interpretate e quindi disegnate sulle sezioni stratigrafiche, con una granulometria relativamente poco maggiore.

Di seguito verrà data una breve descrizione delle sezioni misurate, indicandone anche l'esatta ubicazione, dopodichè verranno presentate le sezioni vere e proprie misurate strato a strato. La scala a cui sono state disegnate in origine è di circa 1:50. A fianco degli strati più spessi è riportata anche una numerazione in ordine crescente (da 1 a 686) messa dopo aver effettuato la correlazione; in altre parole ogni numero indica sempre lo stesso strato in tutte le sezioni, perciò se si vuole vedere come cambia uno strato con la distanza si prende il numero dello strato e lo si va a vedere nelle altre sezioni. Gli strati guida, invece, sono indicati con il nome e un numero crescente che per quanto riguarda le colombine è caratterizzato da un'intervallo che va di 5 in 5 (vedasi capitolo 5 volume I). Per quanto riguarda, invece, le colombine 1, 2, 3, 4 e 5 è stata mantenuta la stessa nomenclatura introdotta da Ricci Lucchi e Valmori (1980).

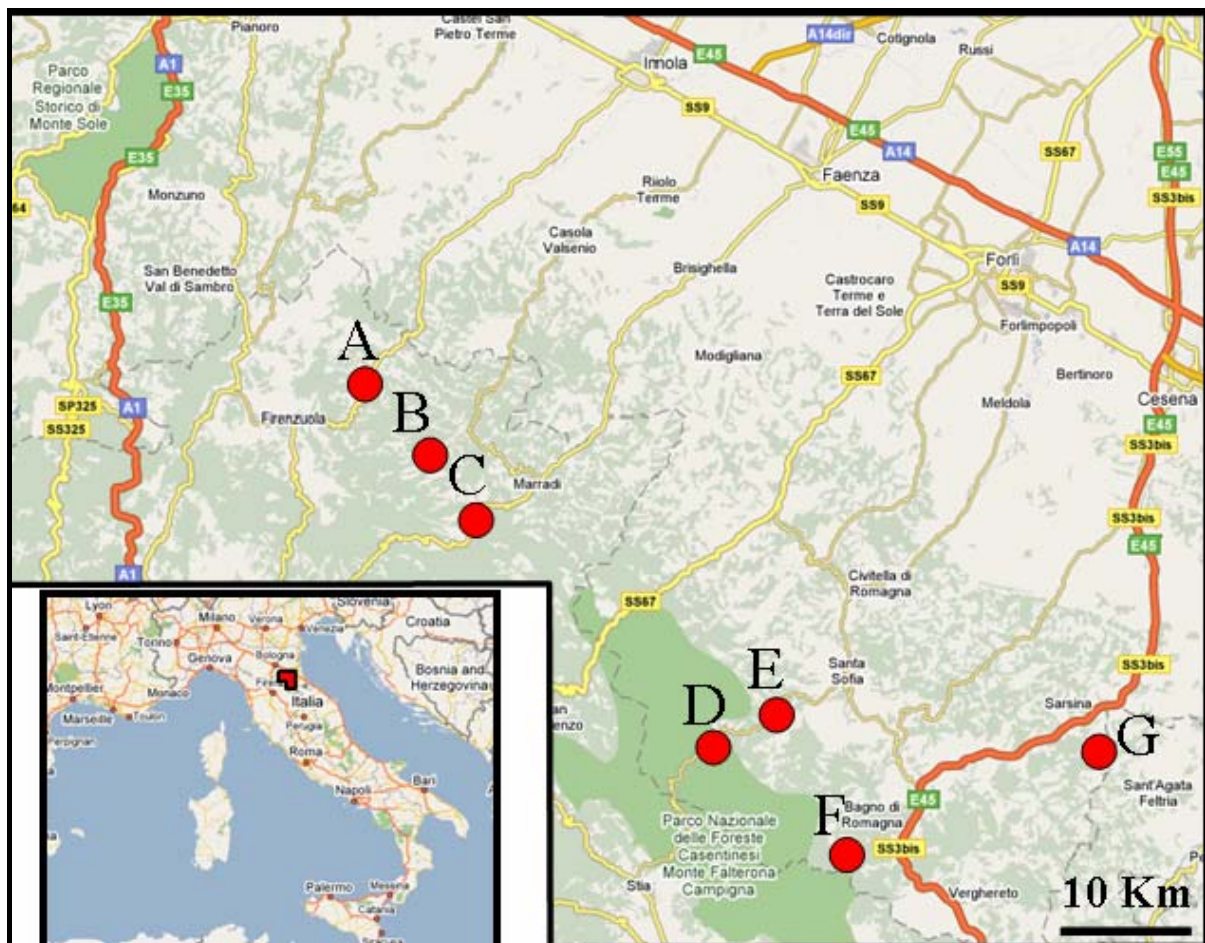


Figura 1 – Mappa di localizzazione delle sezioni stratigrafiche.

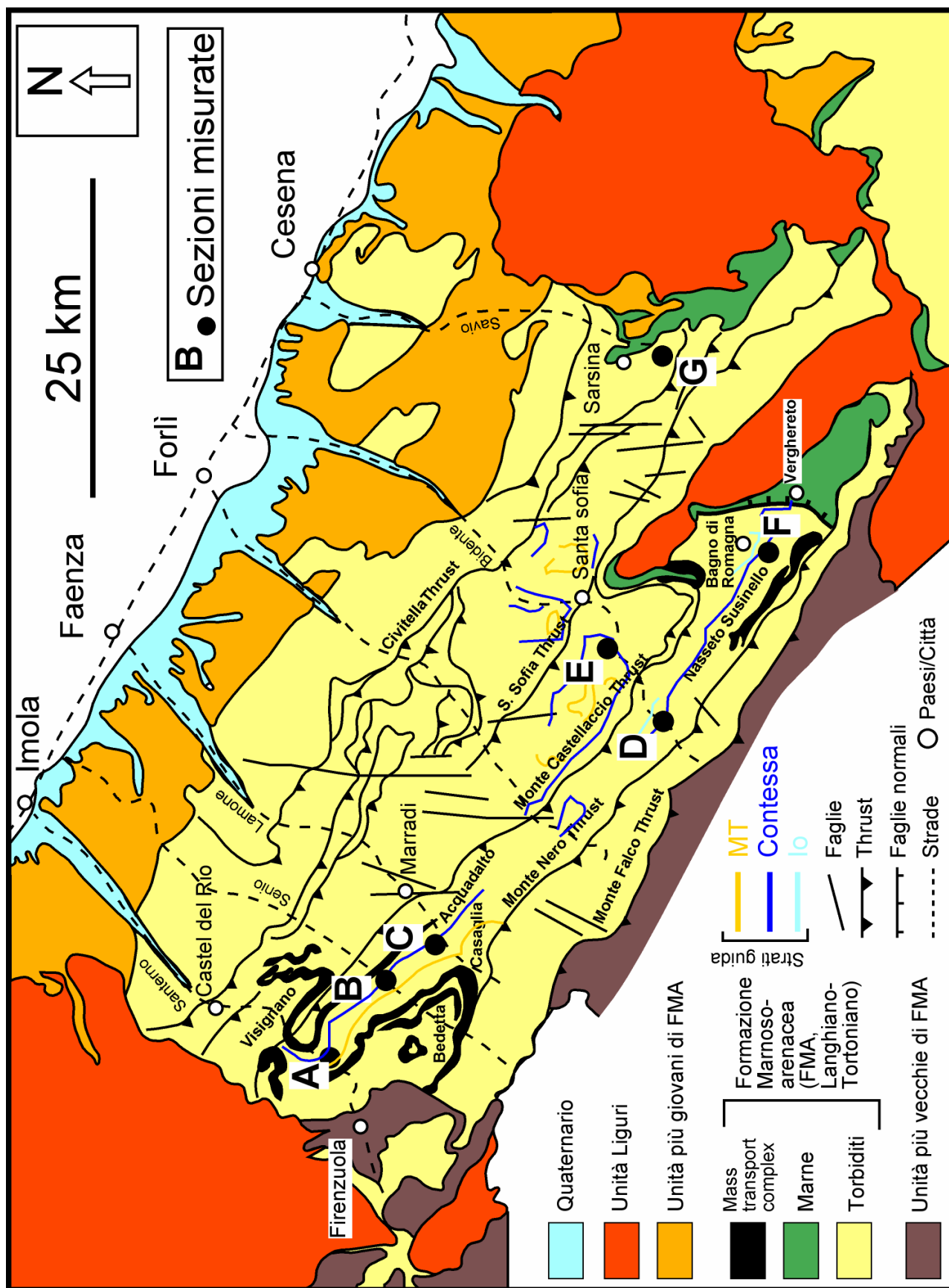
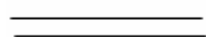


Figura 2- Carta geologico-strutturale dell'Appennino Emiliano-romagnolo (modificato da Cerina Feroni, 2002 e Martelli *et al.*, 1994).

Legenda delle principali strutture



Ripple



Lamine orizzontale



Lamine ondulate



Lamine orizzontale con sfuggita d'acqua



Lamine ondulate con sfuggita d'acqua



Clastici pelitici



Frustoli vegetali



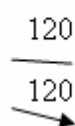
Bioturbazione



Sfuggita d'acqua



Convolute



Groove cast

Flute cast

Paleocorrente



Indifferenziato (pelite e marna)



Pelite



Arenarie massive

Sezione A

La sezione A, con 554 m di spessore totale, affiora lungo l'alveo del fiume Santerno e del torrente Diaterna (Fig. 3). La misura di questa sezione è stata iniziata a sud del paese di Coniale lungo il Fiume Santerno partendo dal Caotico di Acquadalto che in questa zona affiora all'interno di una grande struttura antiforme. La sezione compresa tra questo caotico e lo strato guida Contessa, che affiora proprio alla confluenza tra il Torrente Diaterna e il Fiume del Santerno, è stata misurata lungo l'alveo del Santerno. In questa valle gli strati affiorano abbastanza bene, a parte qualche tratto di copertura che ha costretto l'effettuazione della misura lungo le sponde del fiume. Proprio alla confluenza dei due fiumi sopracitati, però, compare una faglia con un piano verticale, caratterizzata molto probabilmente da un grande rigetto laterale, che mette in contatto lo strato guida Contessa (a est) con strati più giovani (a ovest). A causa di questo problema la sezione fra lo strato Contessa e la Colombina 5 è stata misurata sul versante ad ovest del paese di Coniale (Fig. 3). A partire dalla Colombina 5 fino allo strato 436, invece, la sezione è stata misurata lungo il Torrente Diaterna. In questa valle gli strati affiorano molto bene, anche se nella parte superiore della sezione compare ancora una volta un sistema di faglie che ha impossibilitato la continuazione del lavoro di misurazione. Soltanto una piccola porzione più superiore, circa 90 m al di sotto dello strato guida Colombina 30 (MT), è stata misurata lungo Fiume del Santerno e sulla strada SS610, a circa 2 Km a sud dalla confluenza tra il fiume Santerno e il torrente Diaterna (Fig 3).

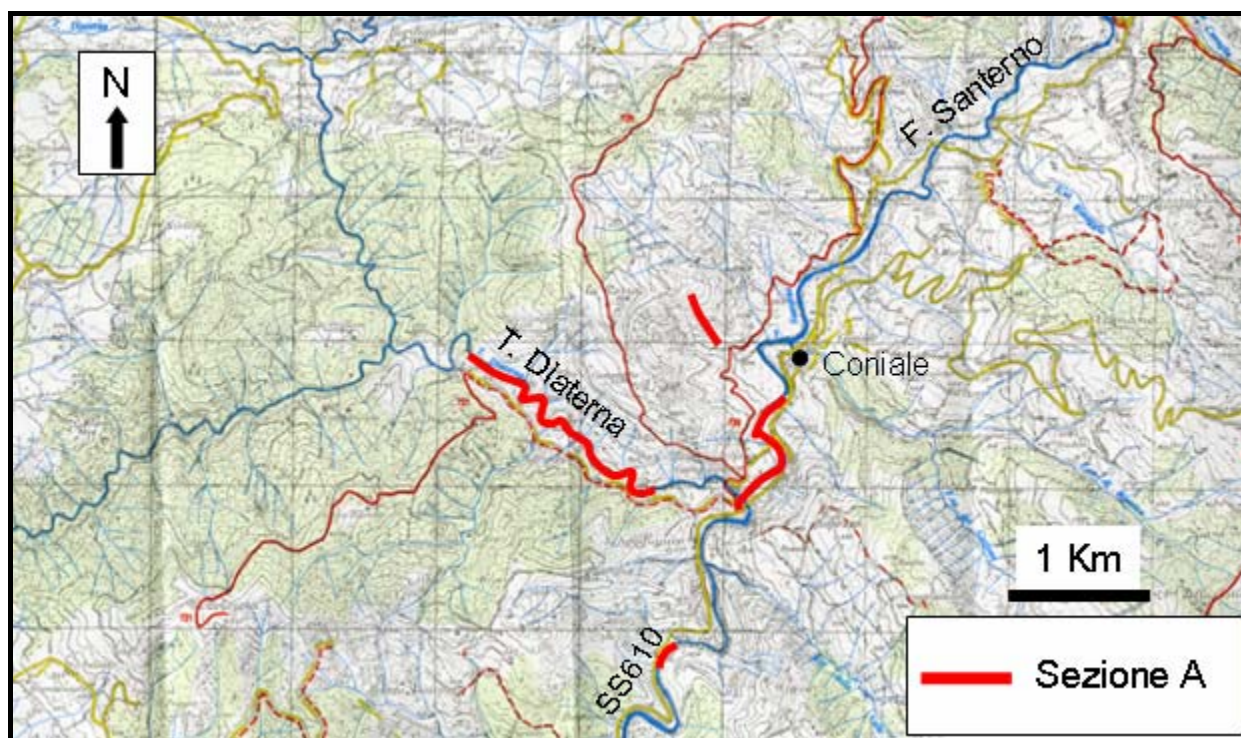
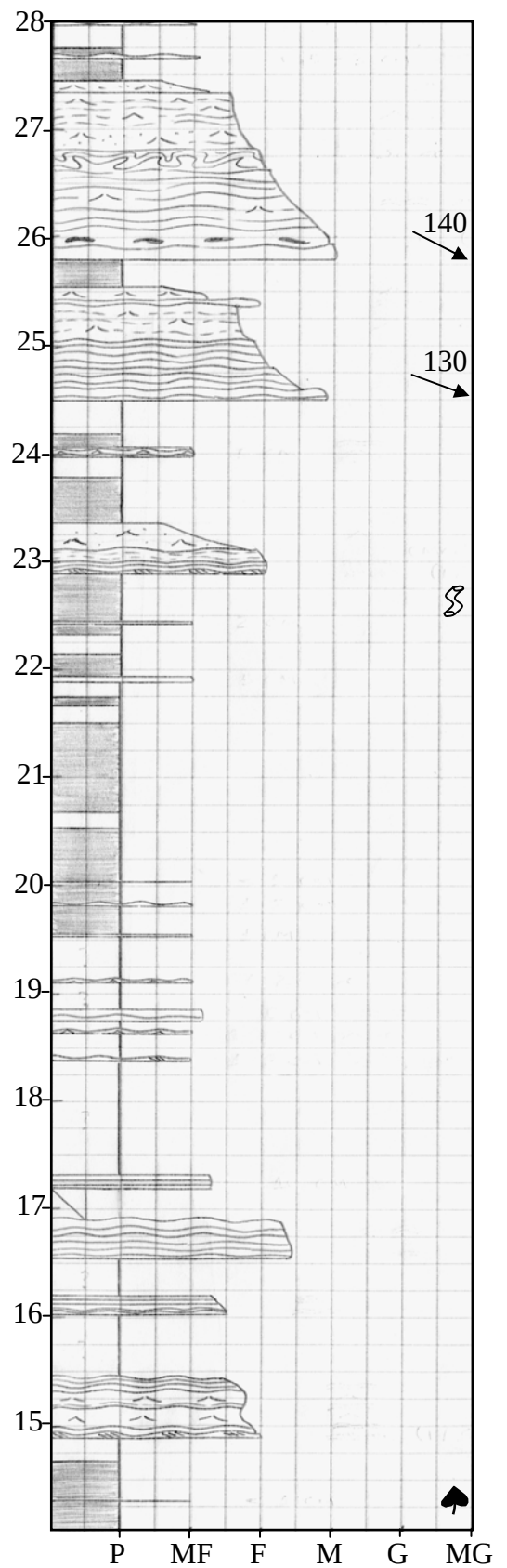
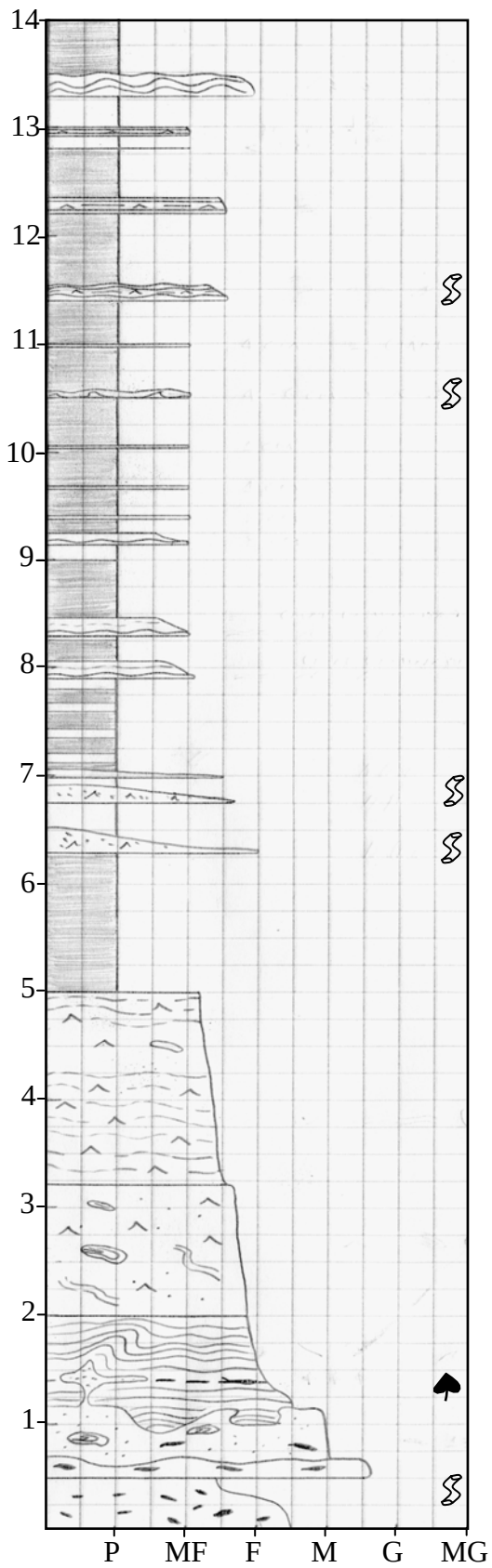
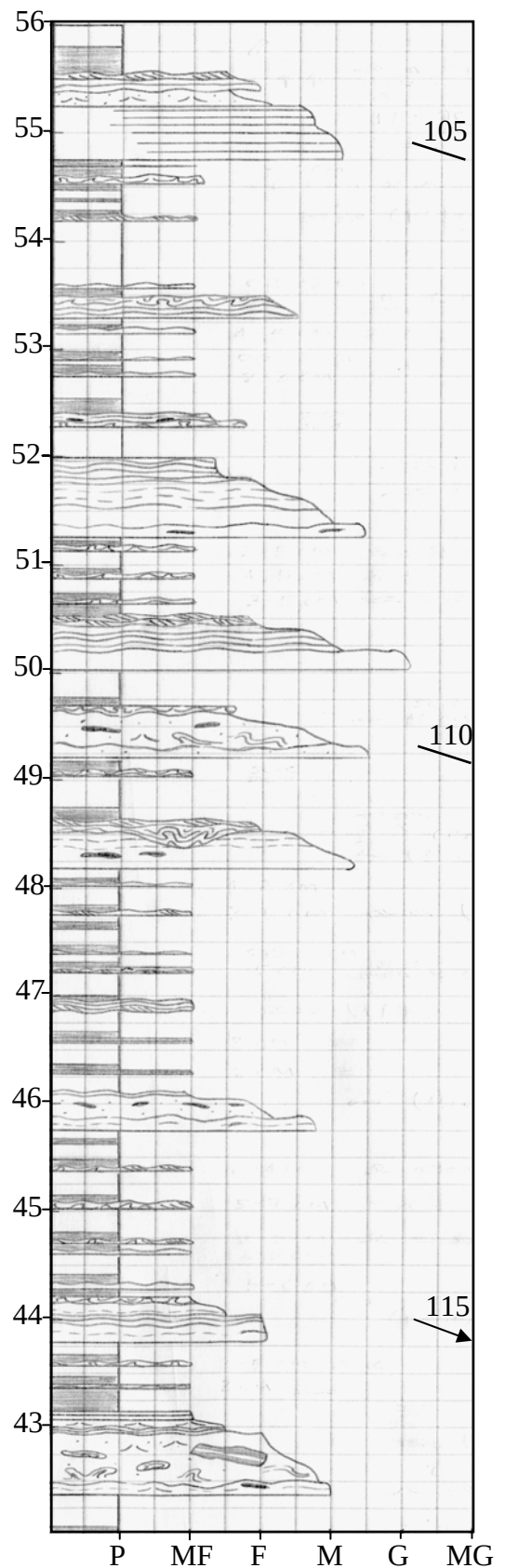
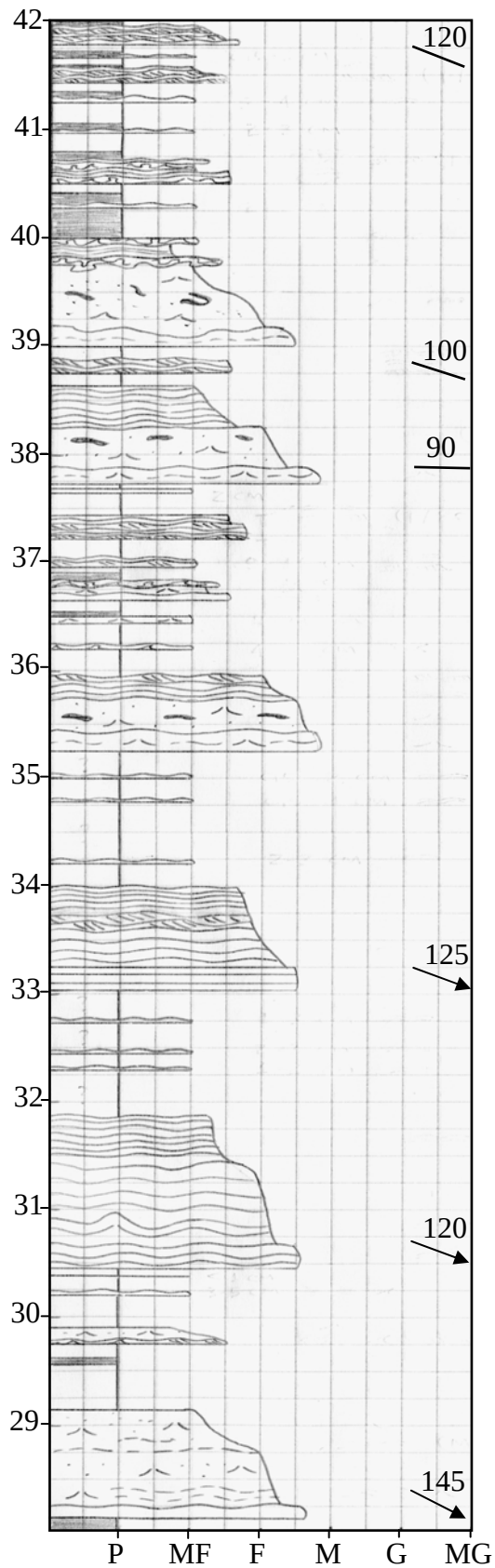


Figura 3- Mappa di localizzazione della sezione A, Valle del Santerno.

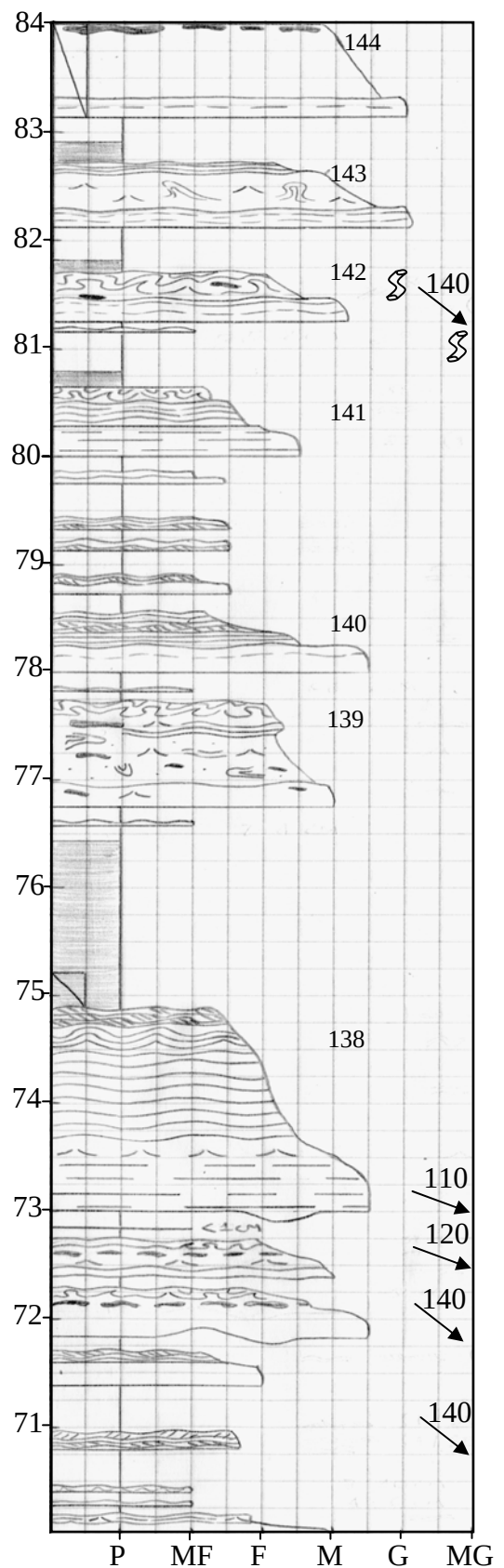
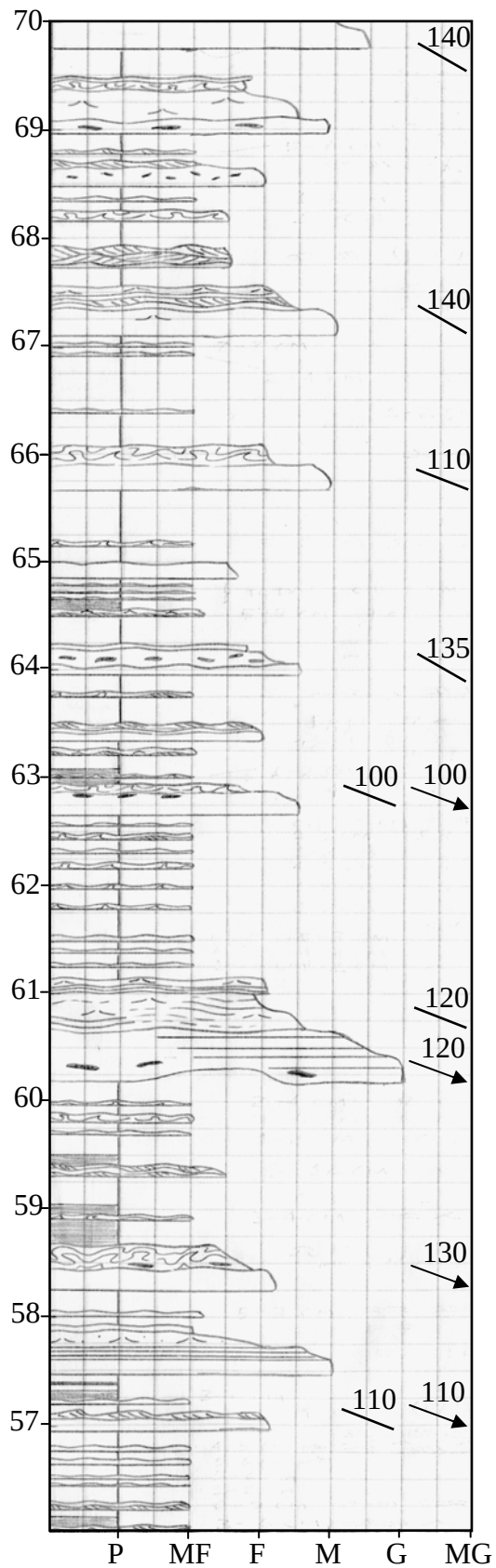
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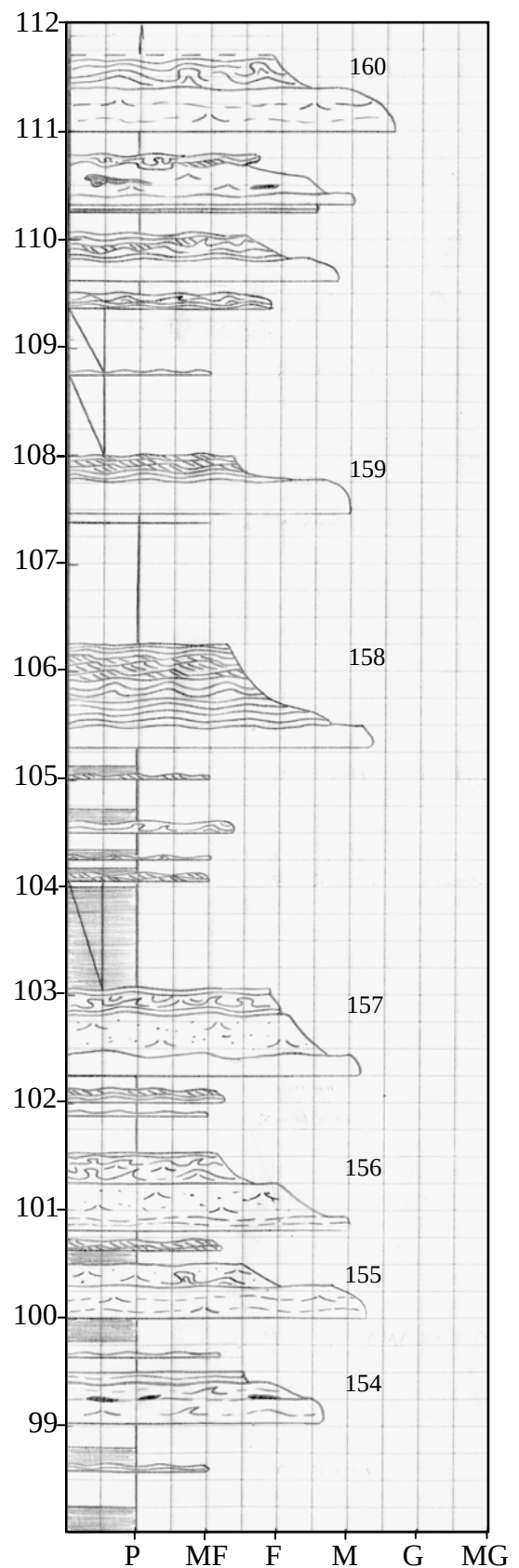
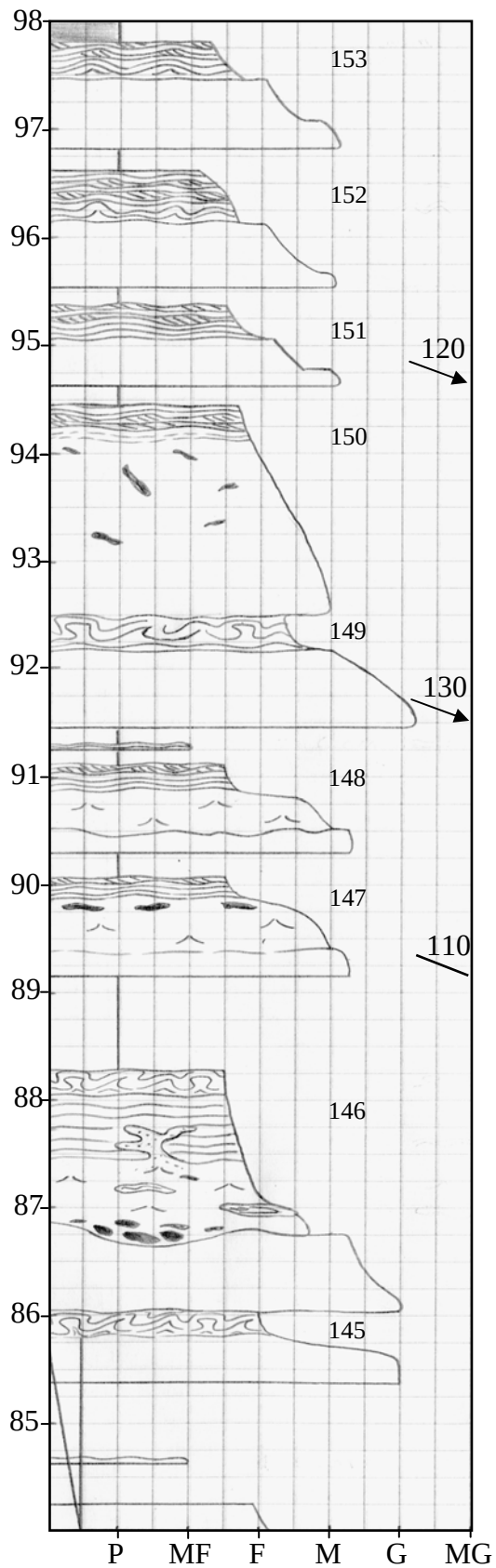
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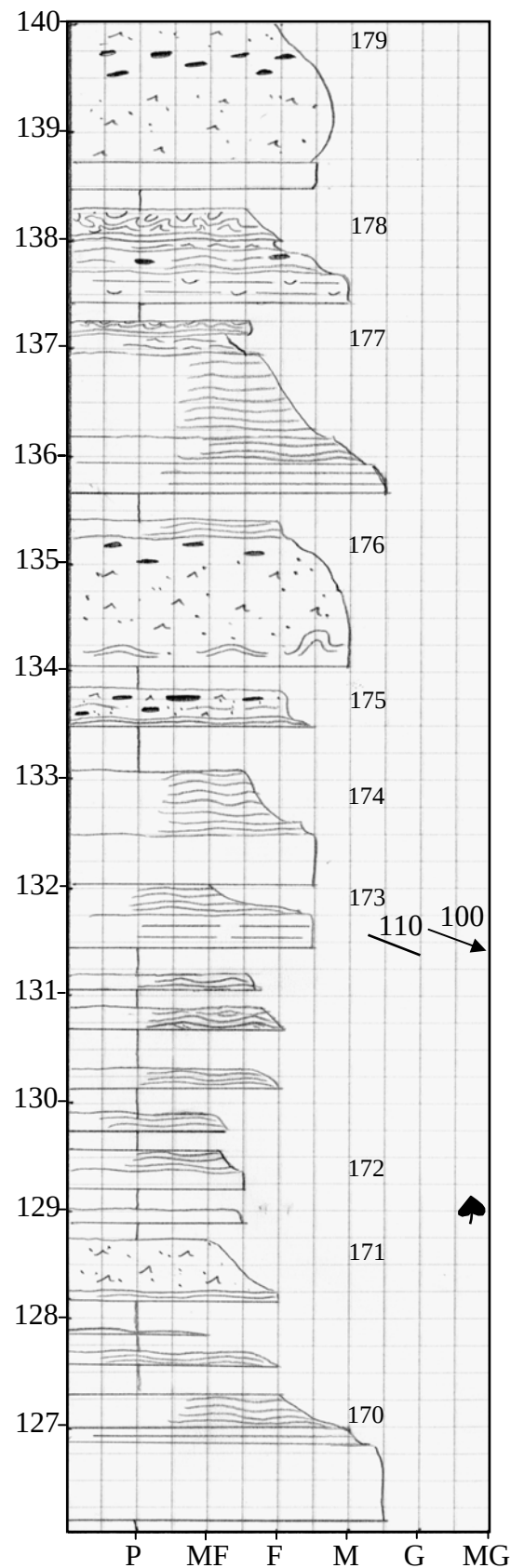
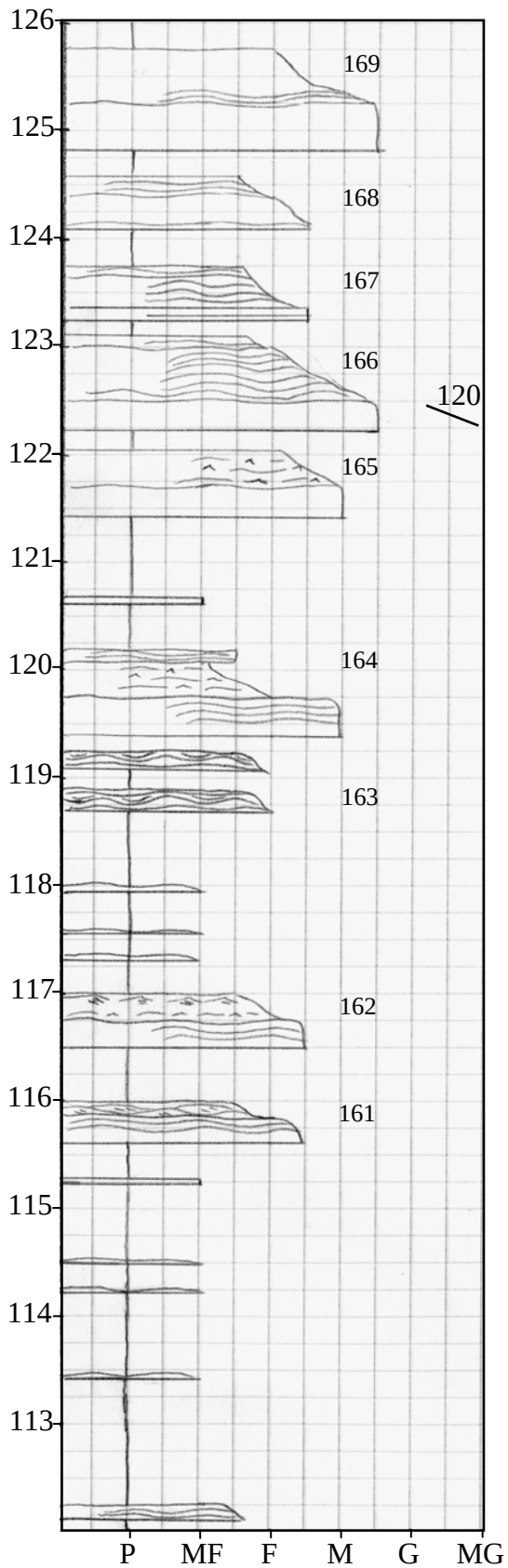
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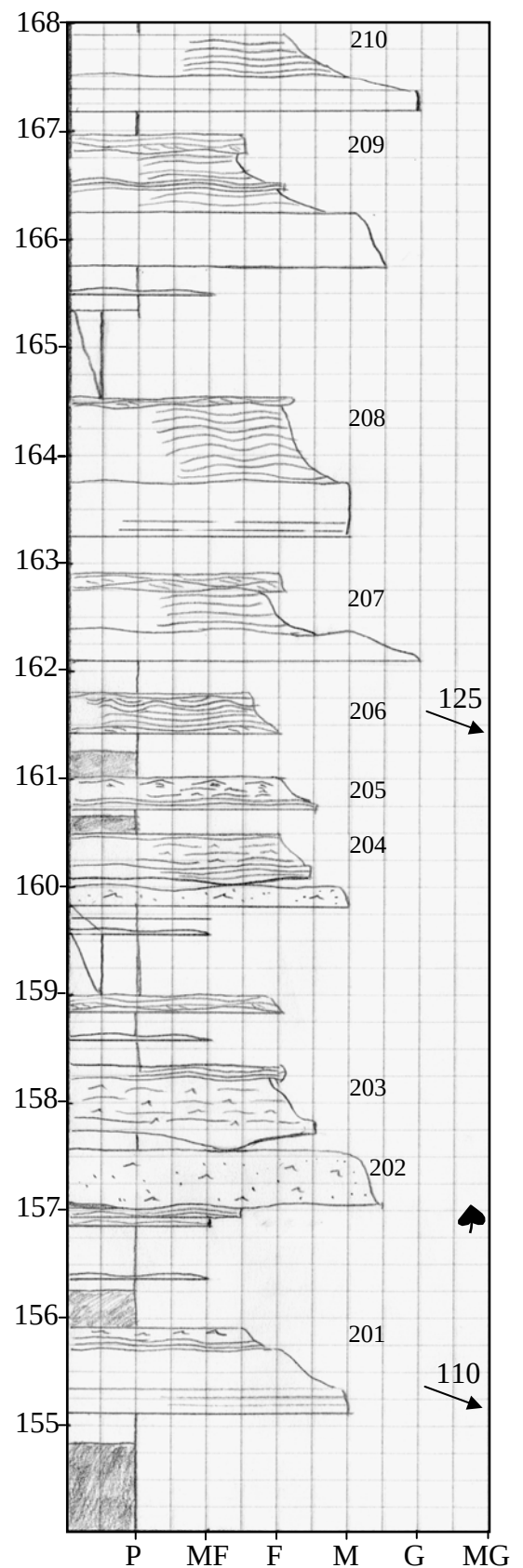
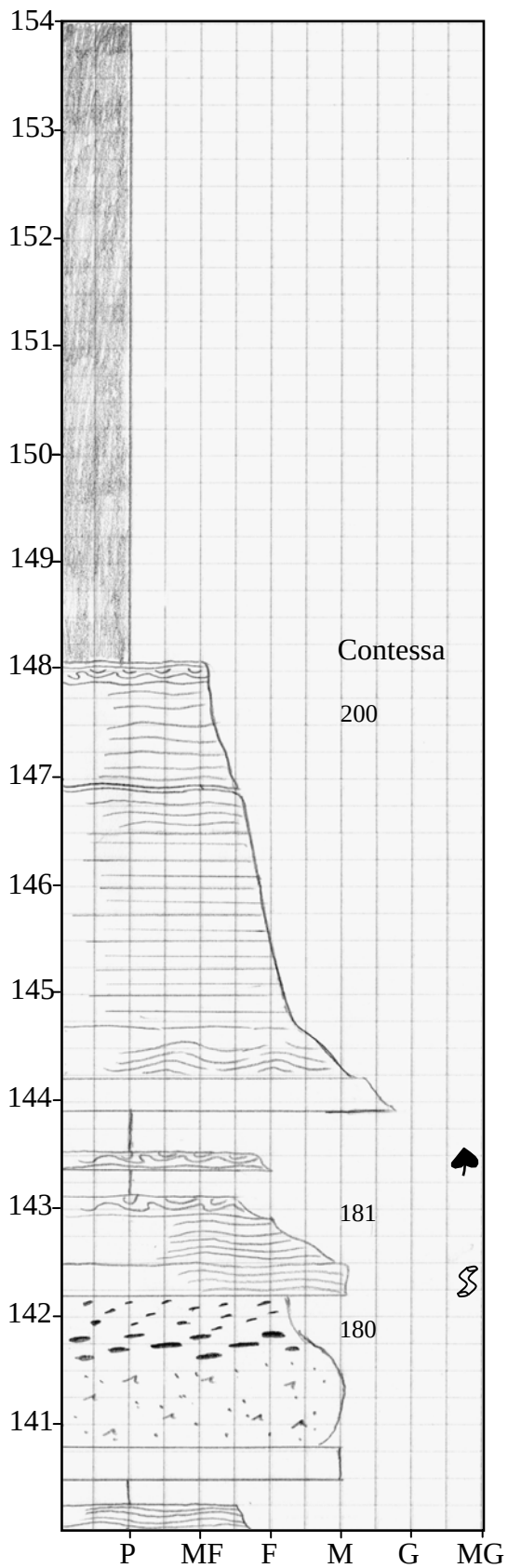
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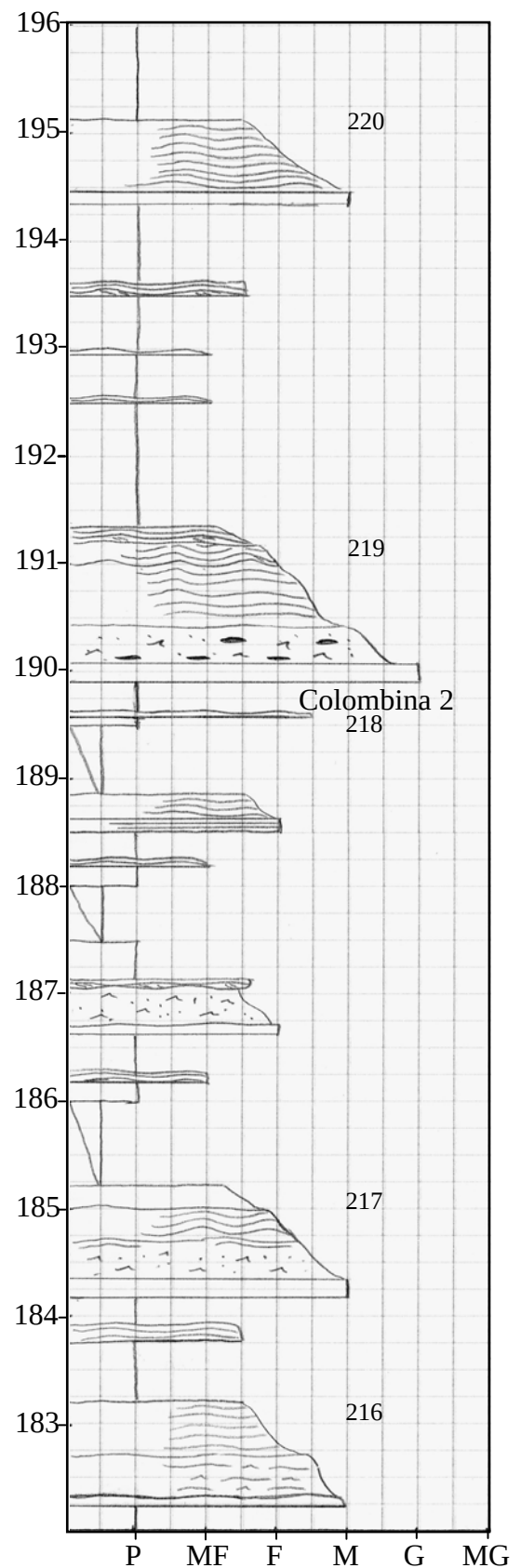
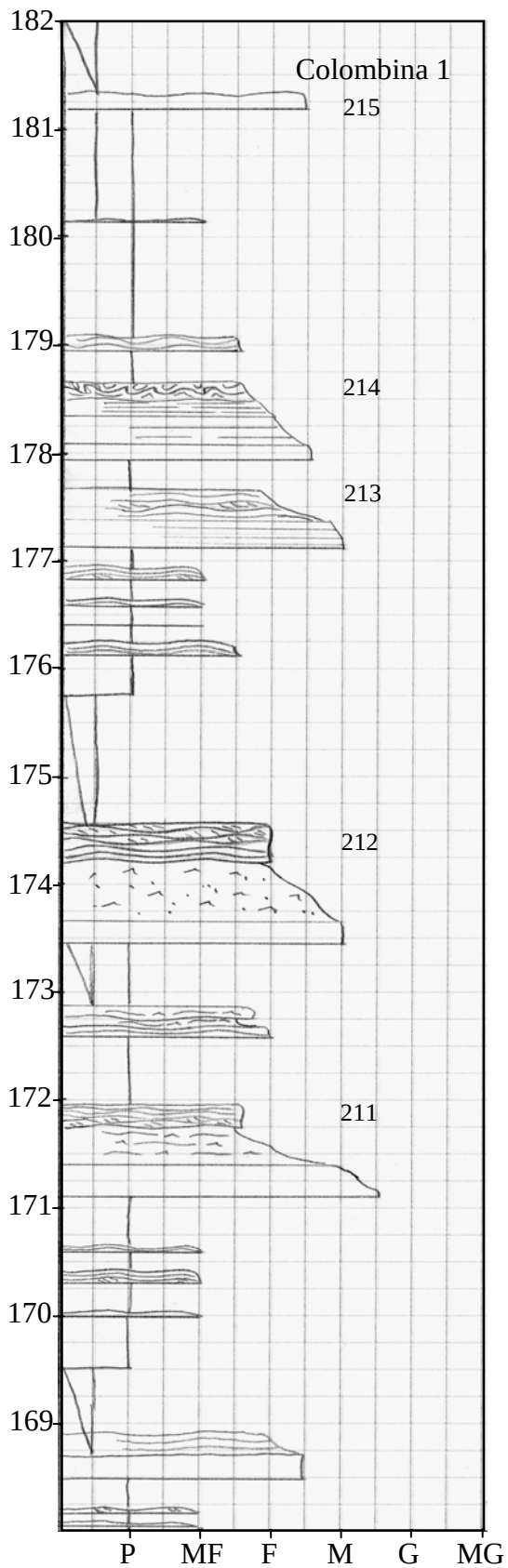
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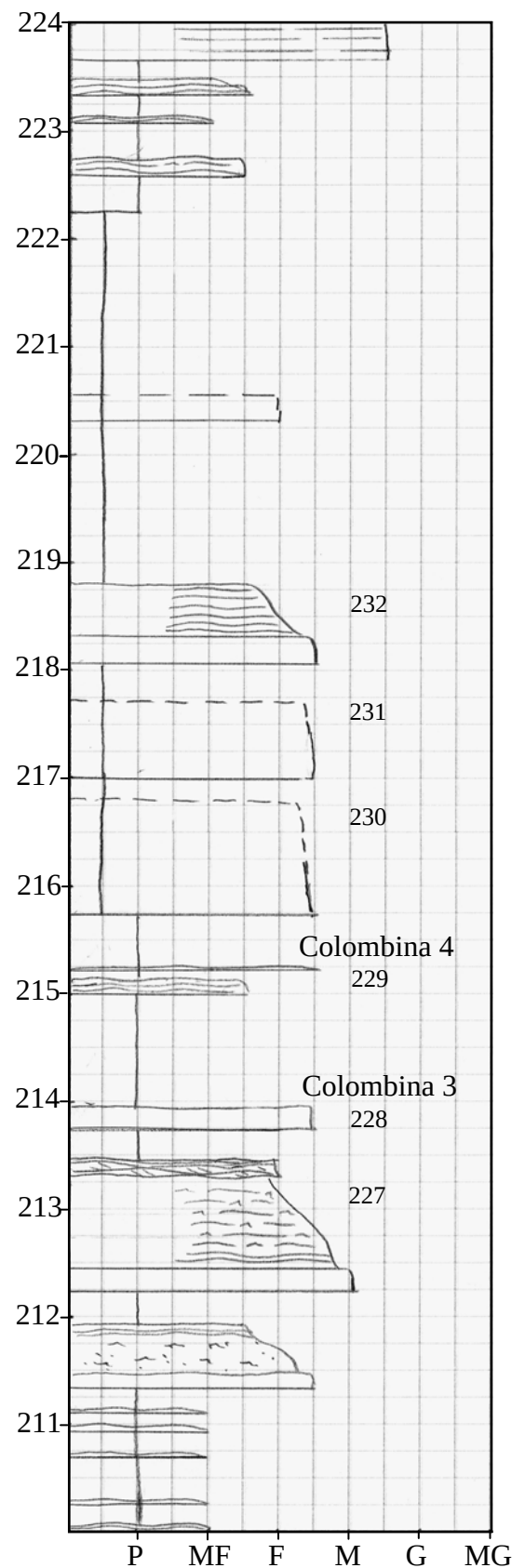
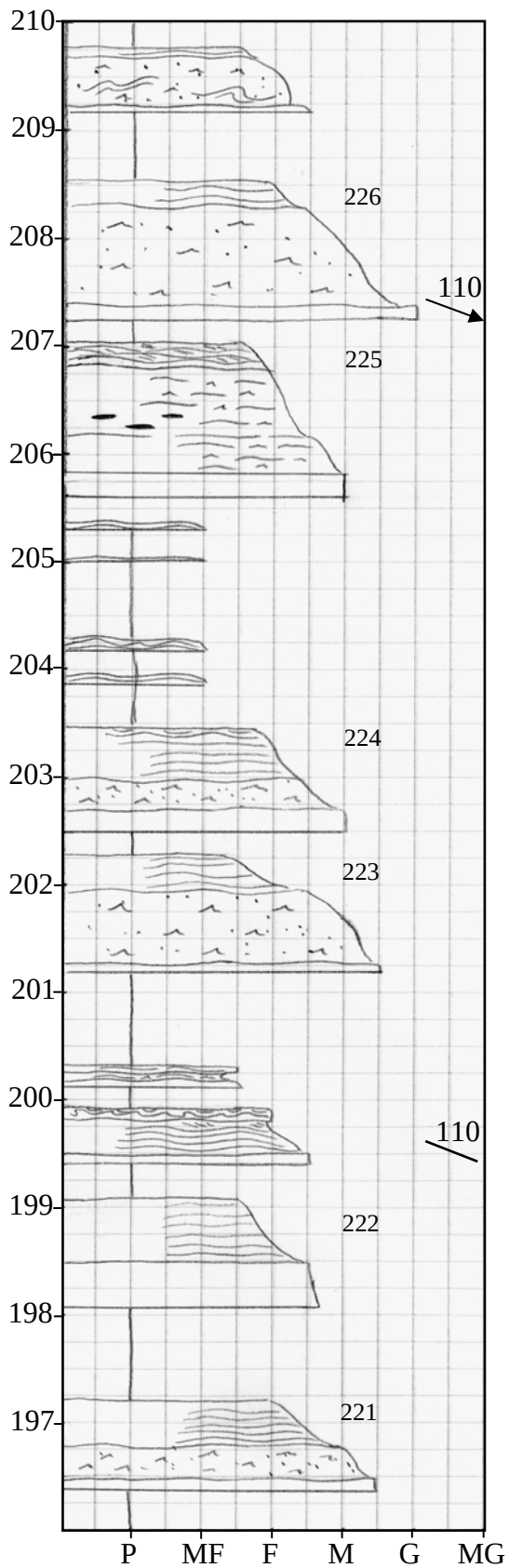
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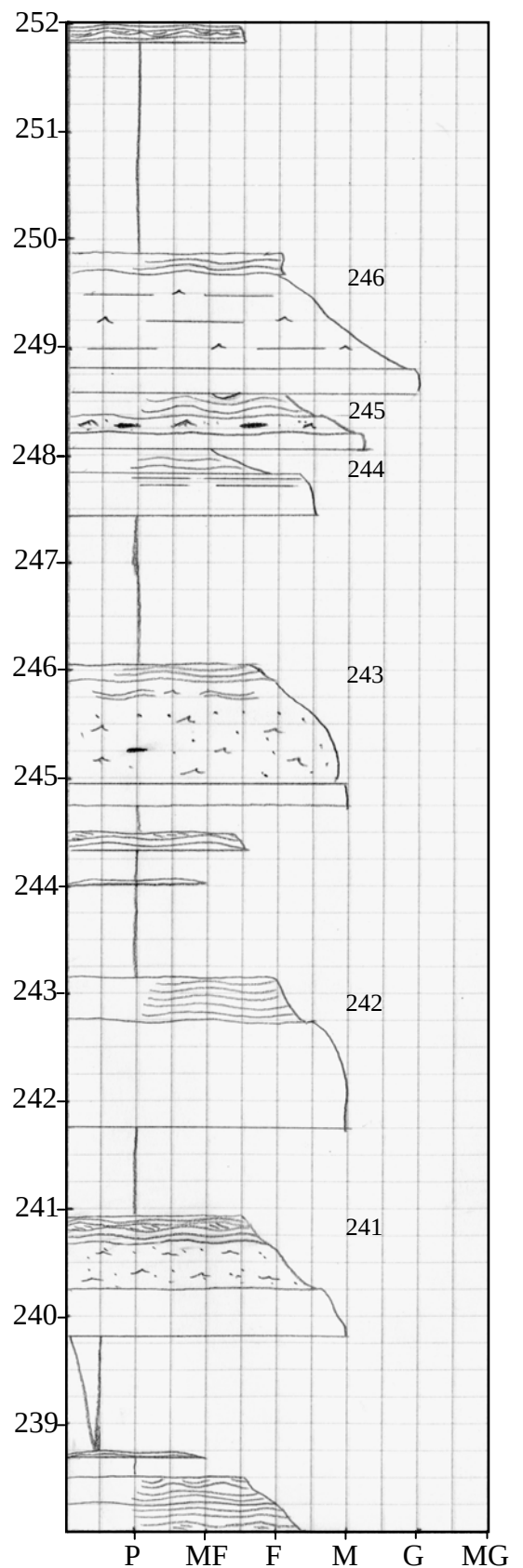
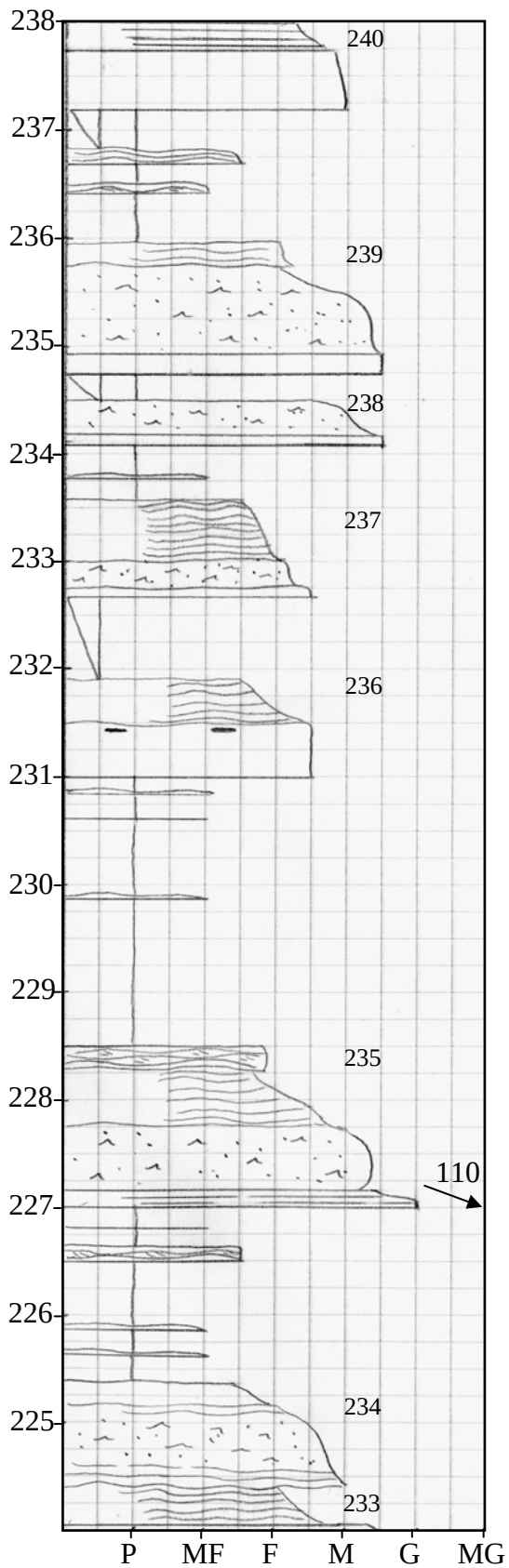
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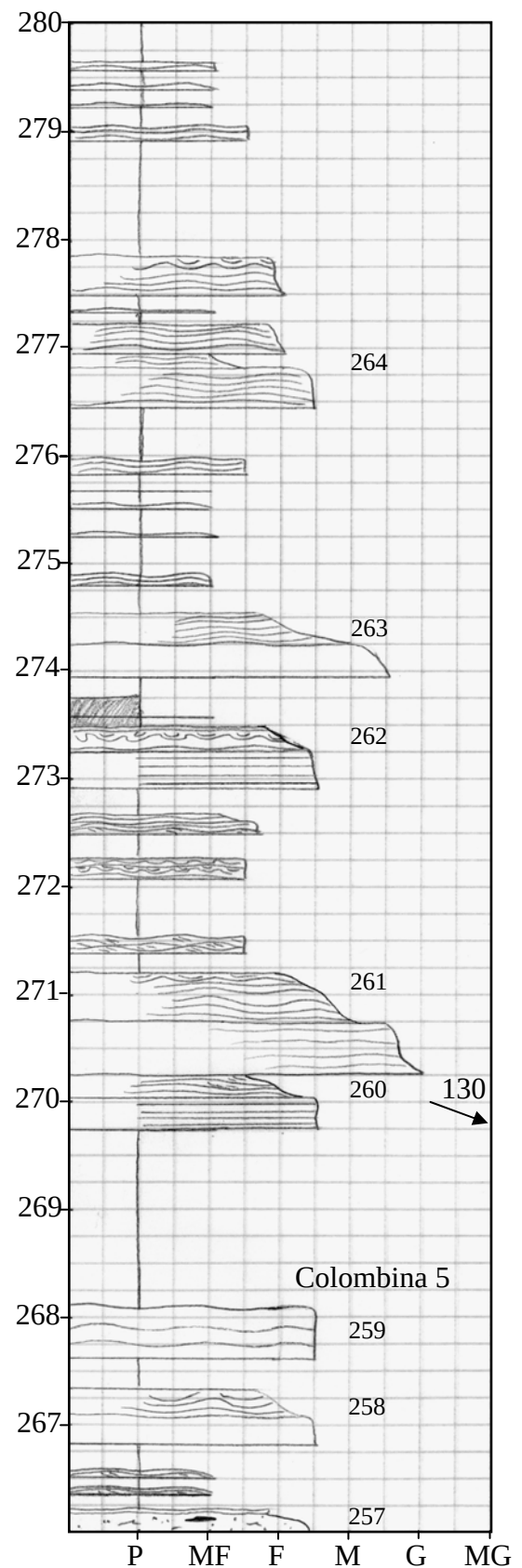
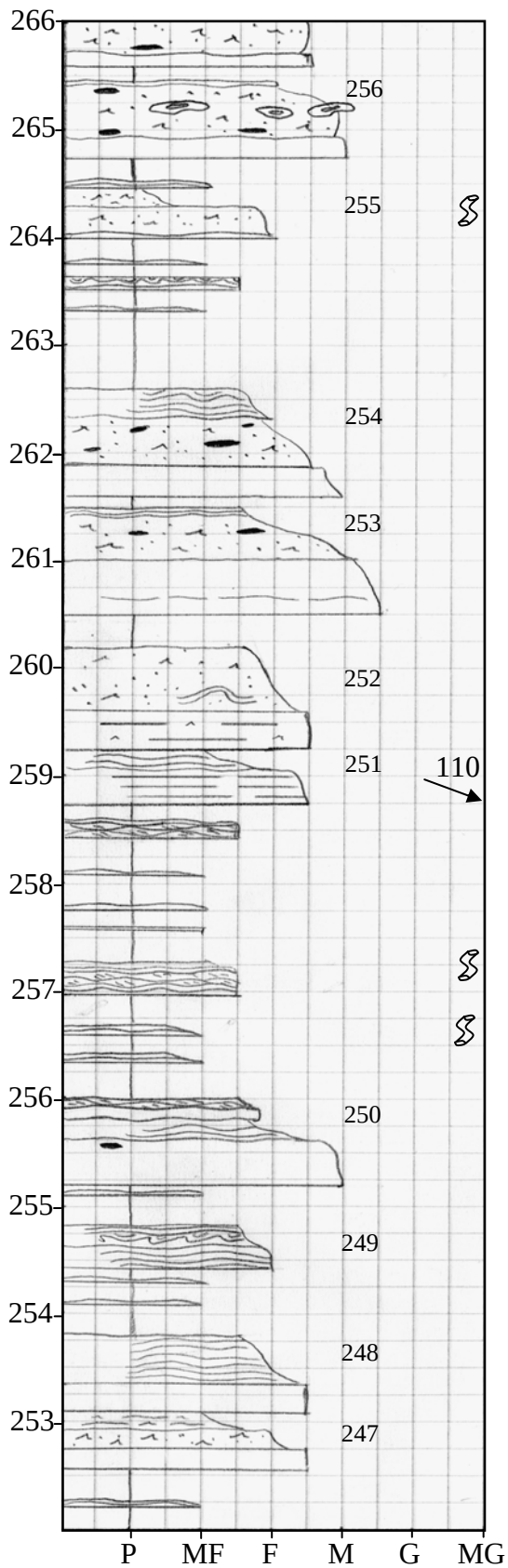
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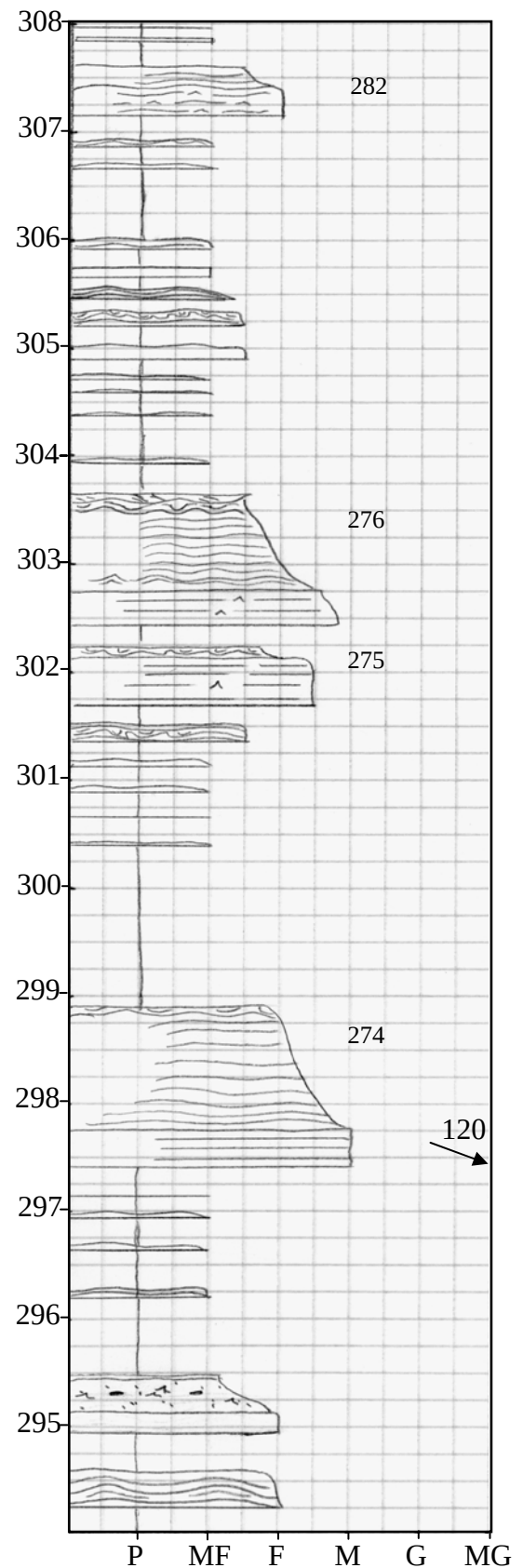
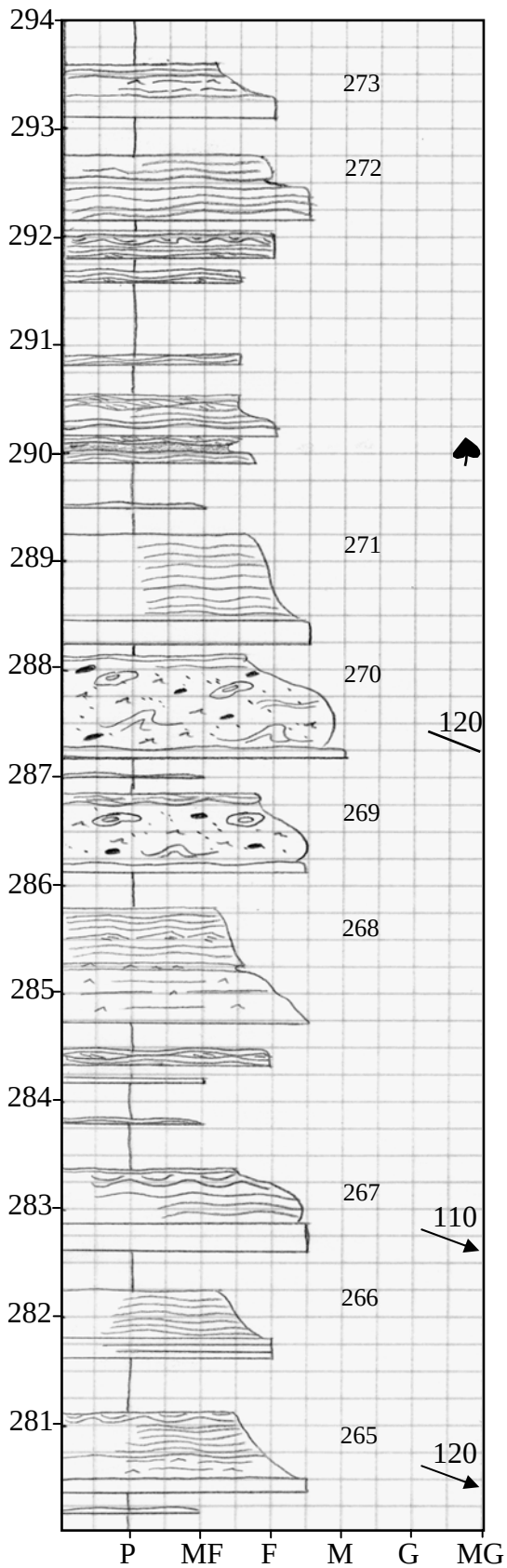
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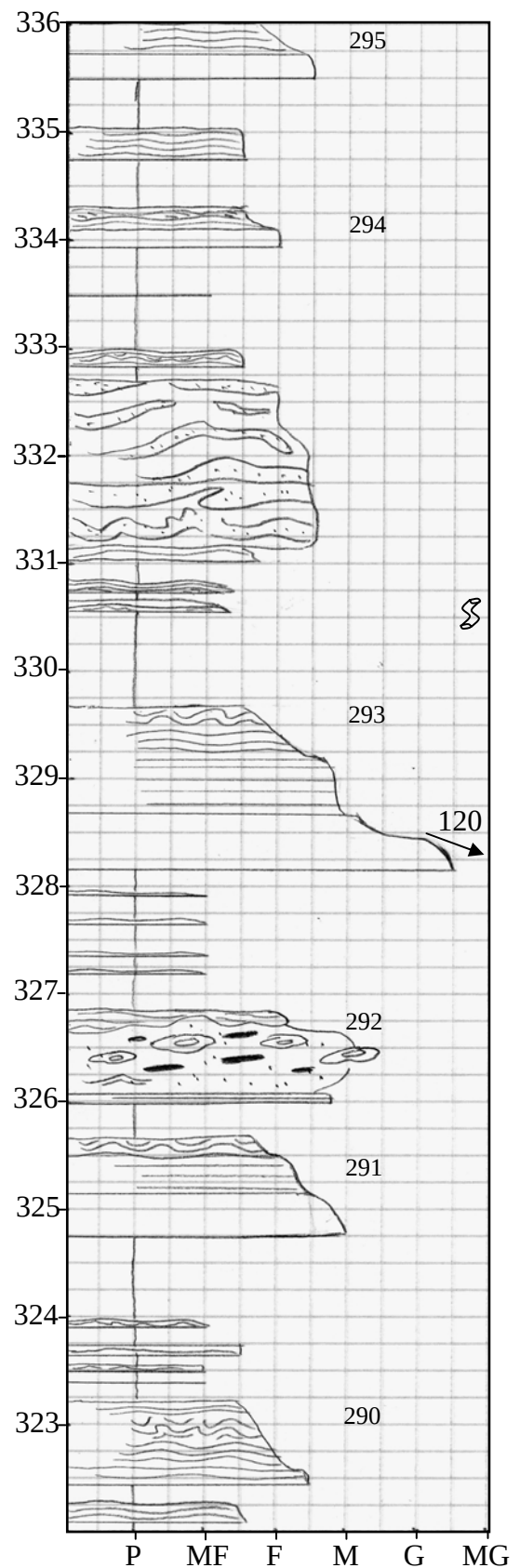
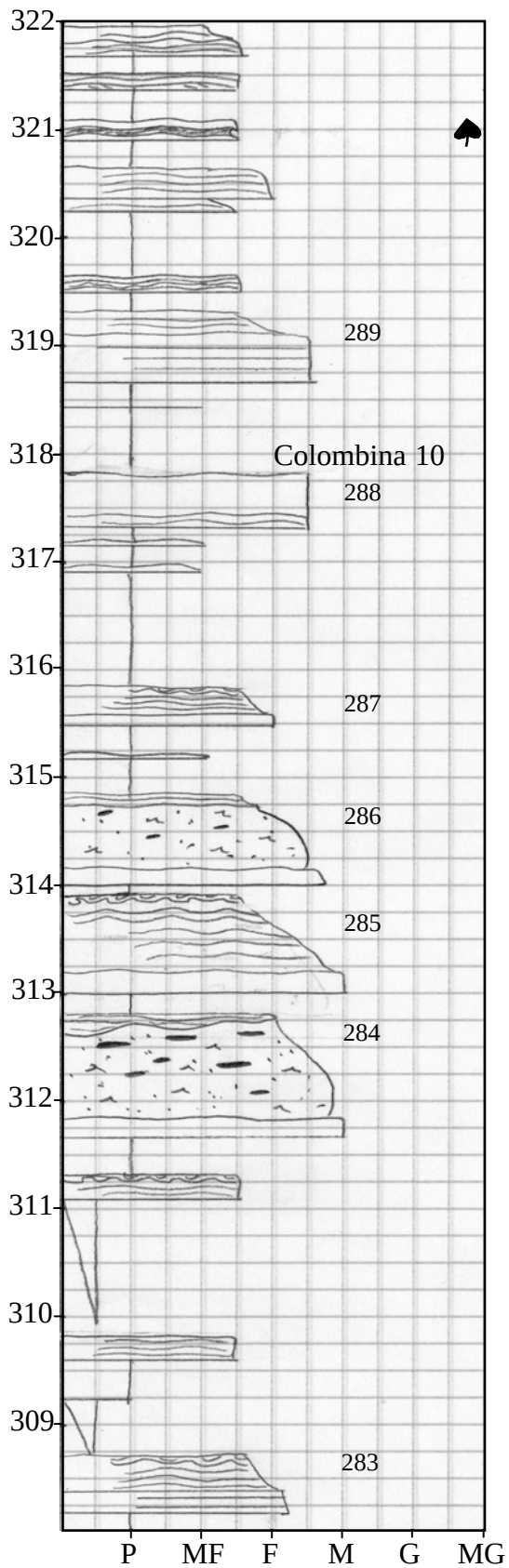
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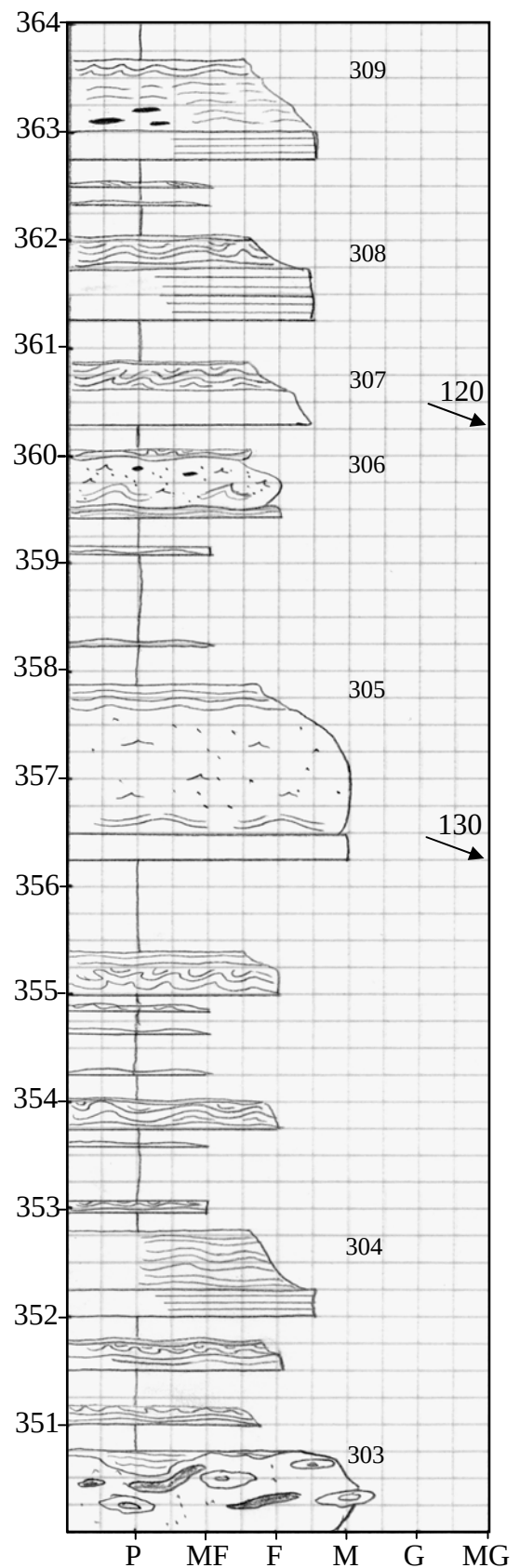
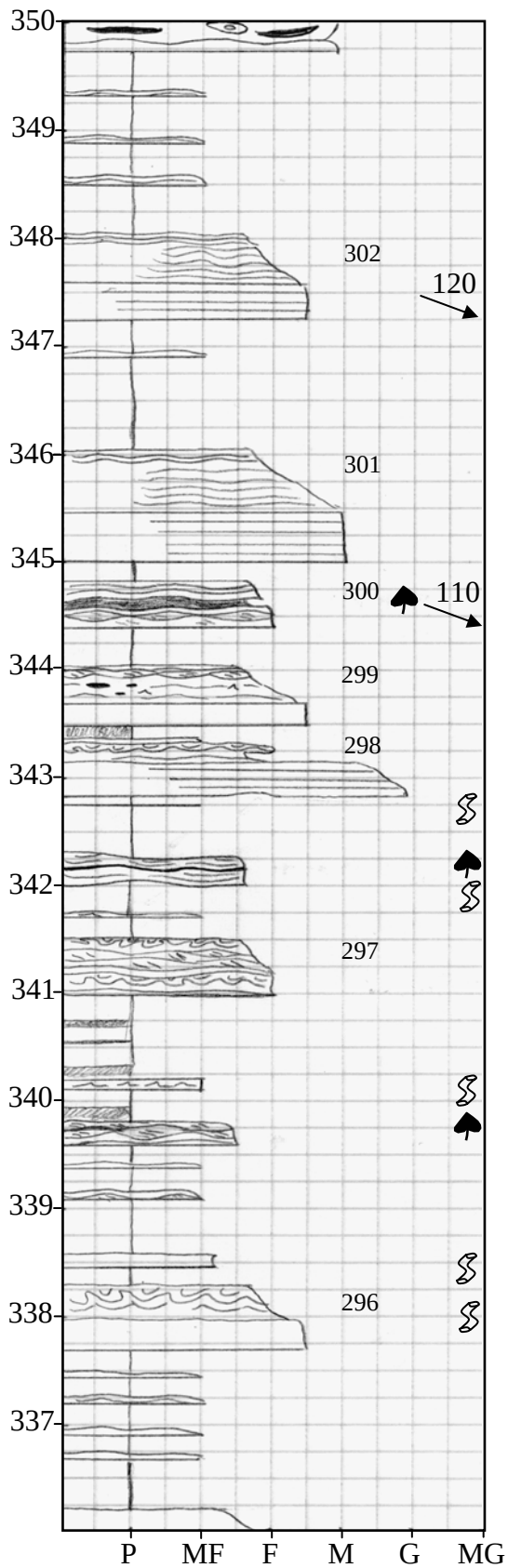
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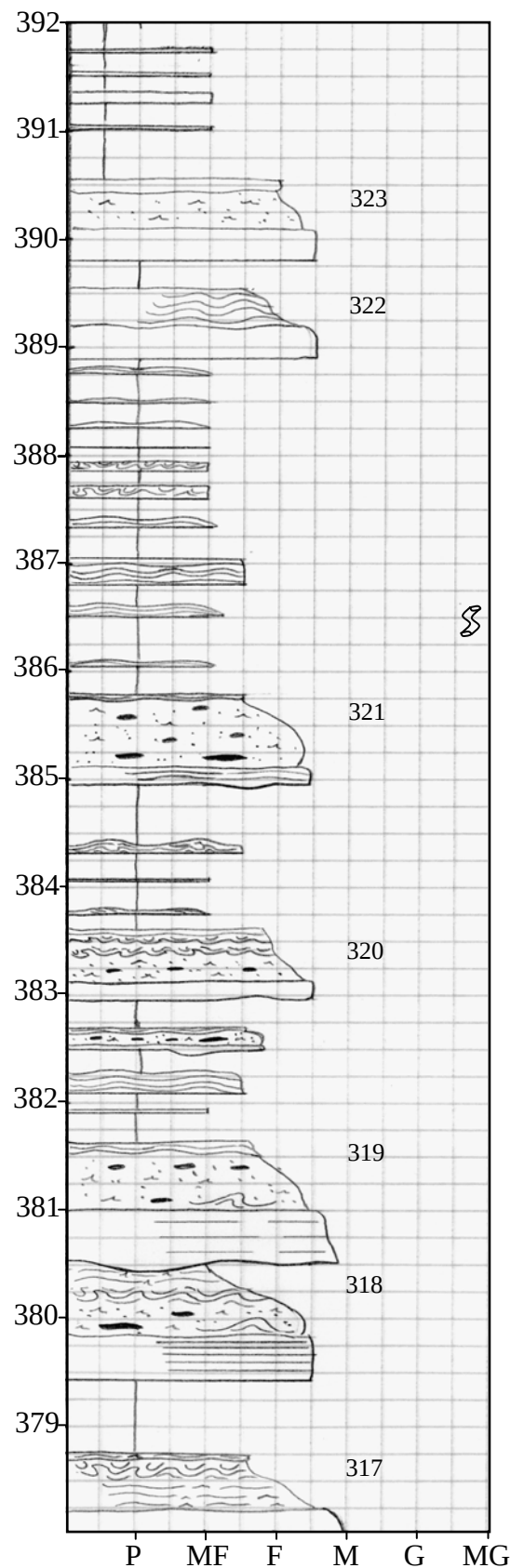
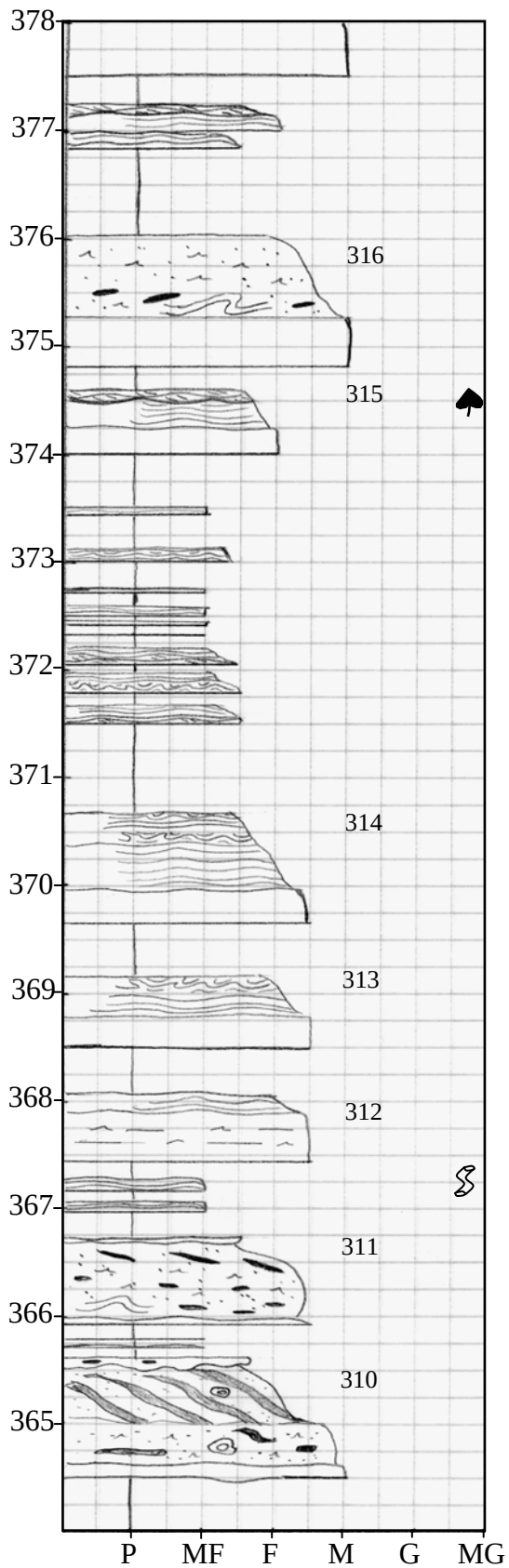
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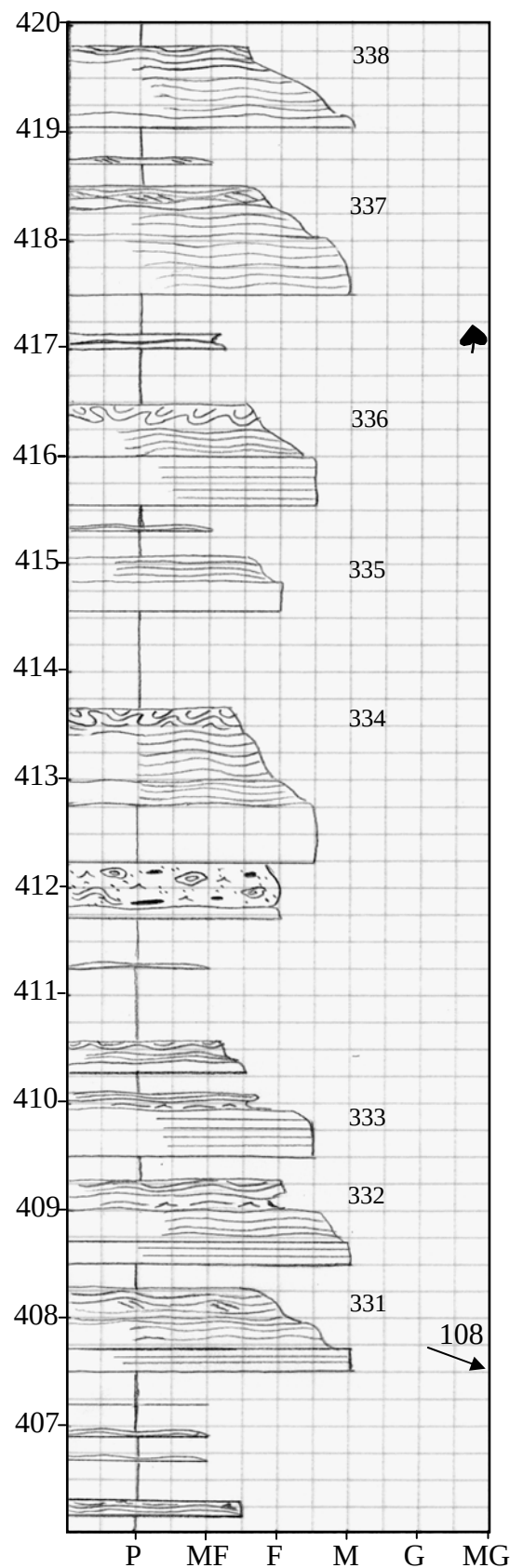
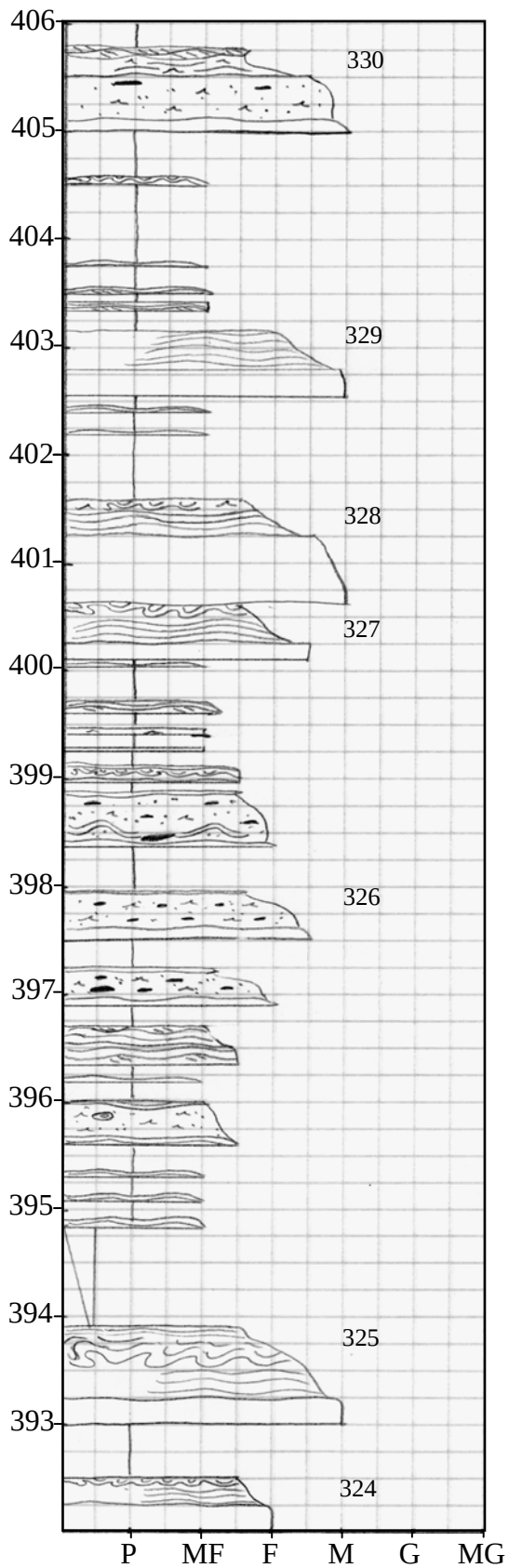
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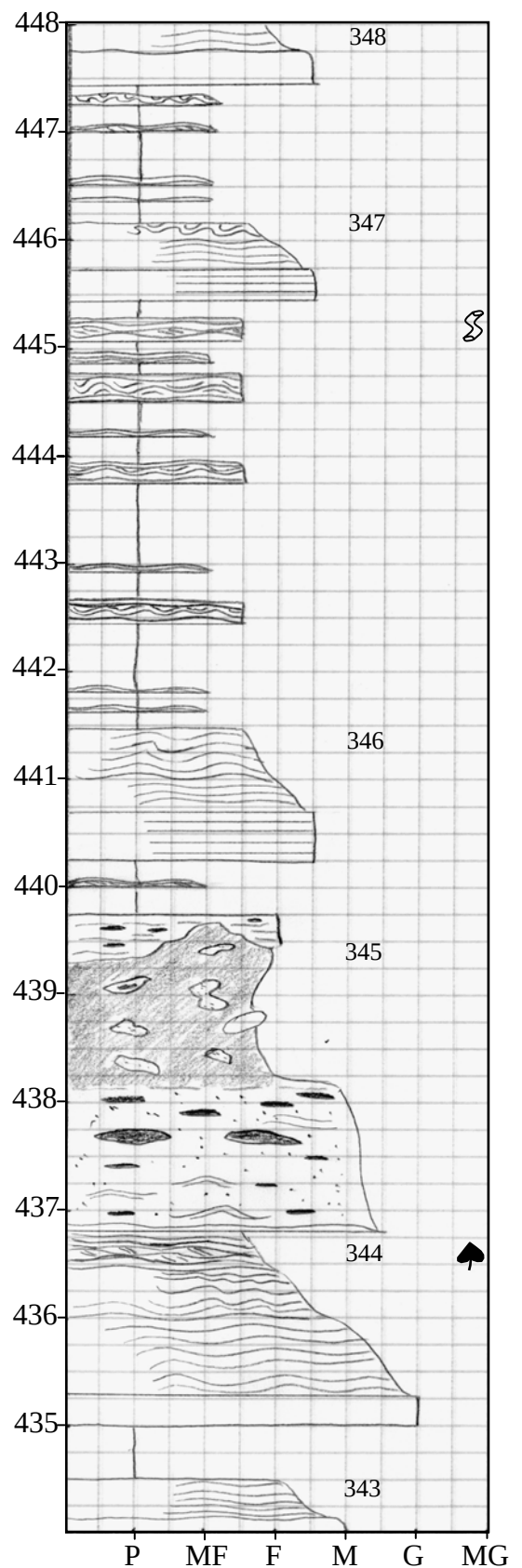
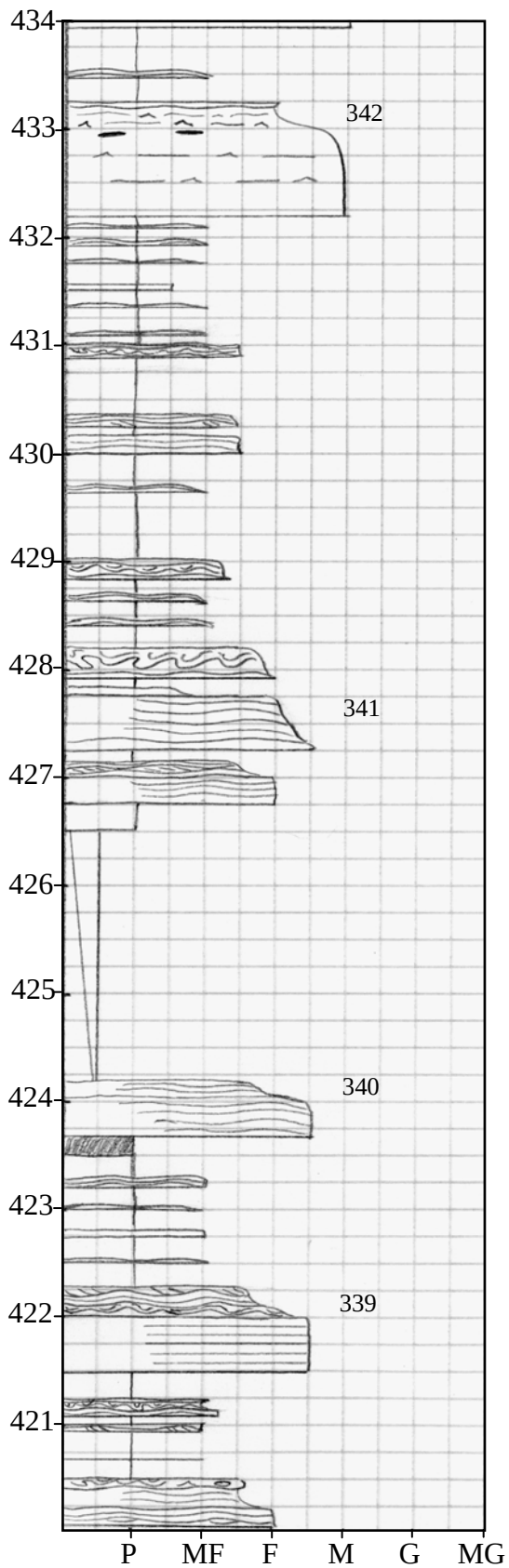
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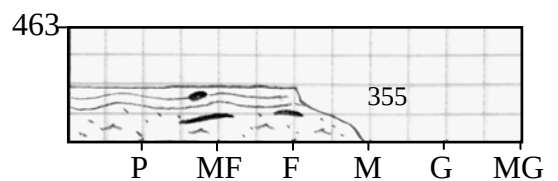
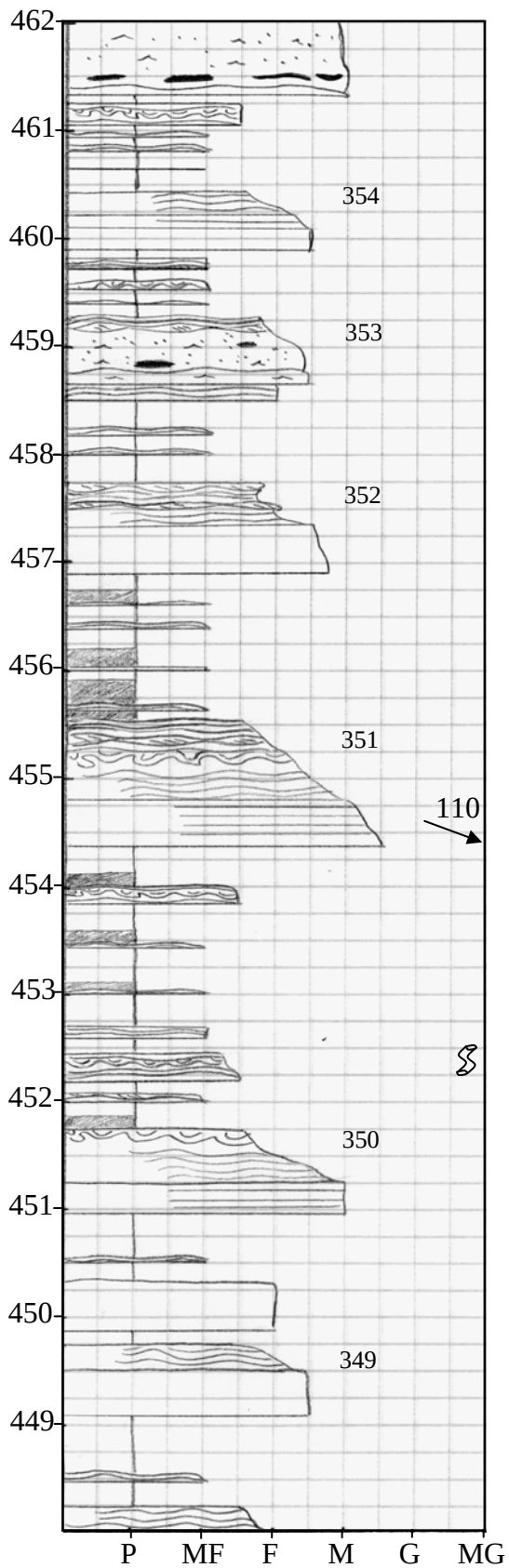
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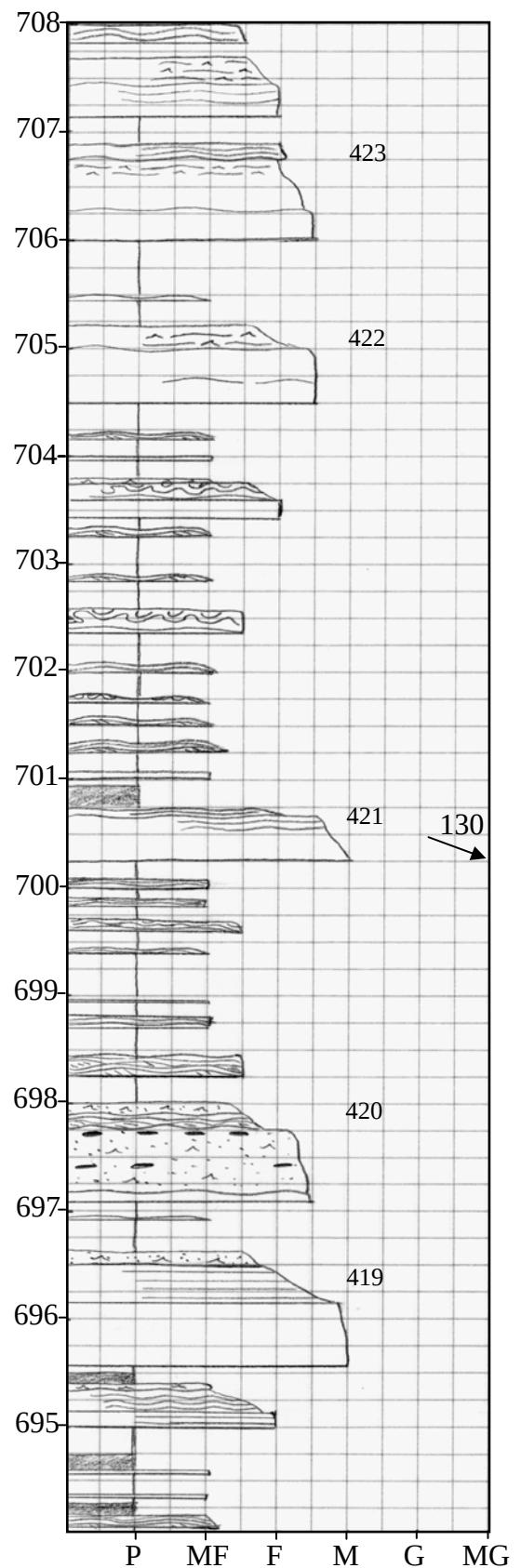
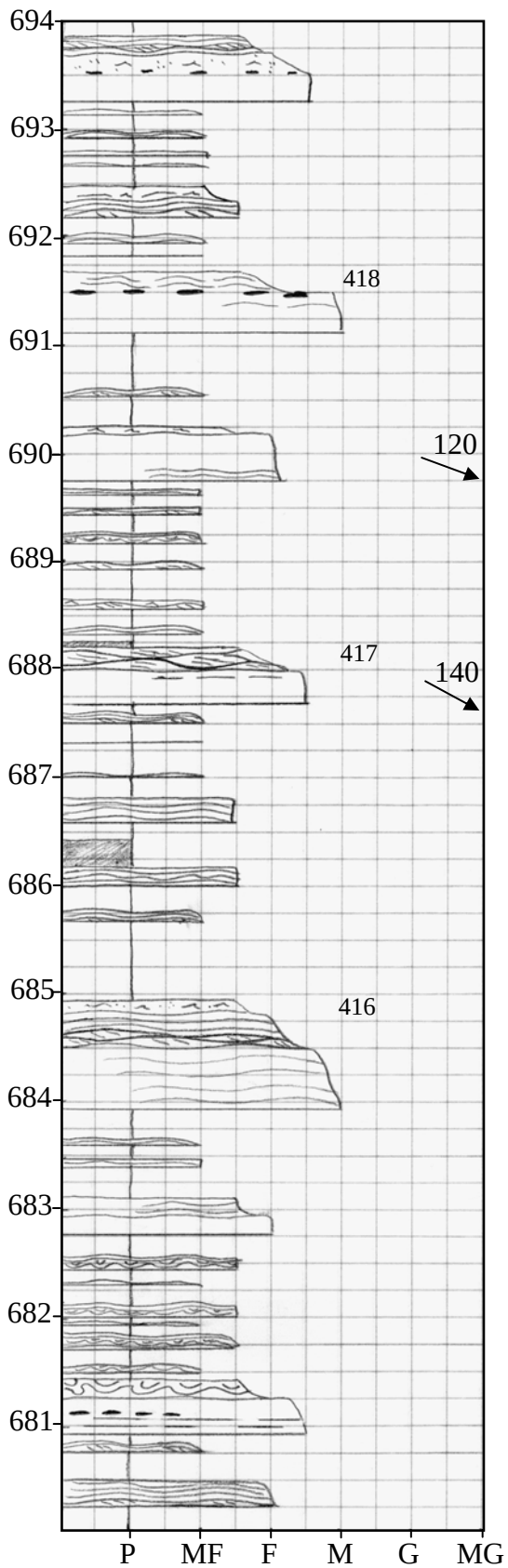
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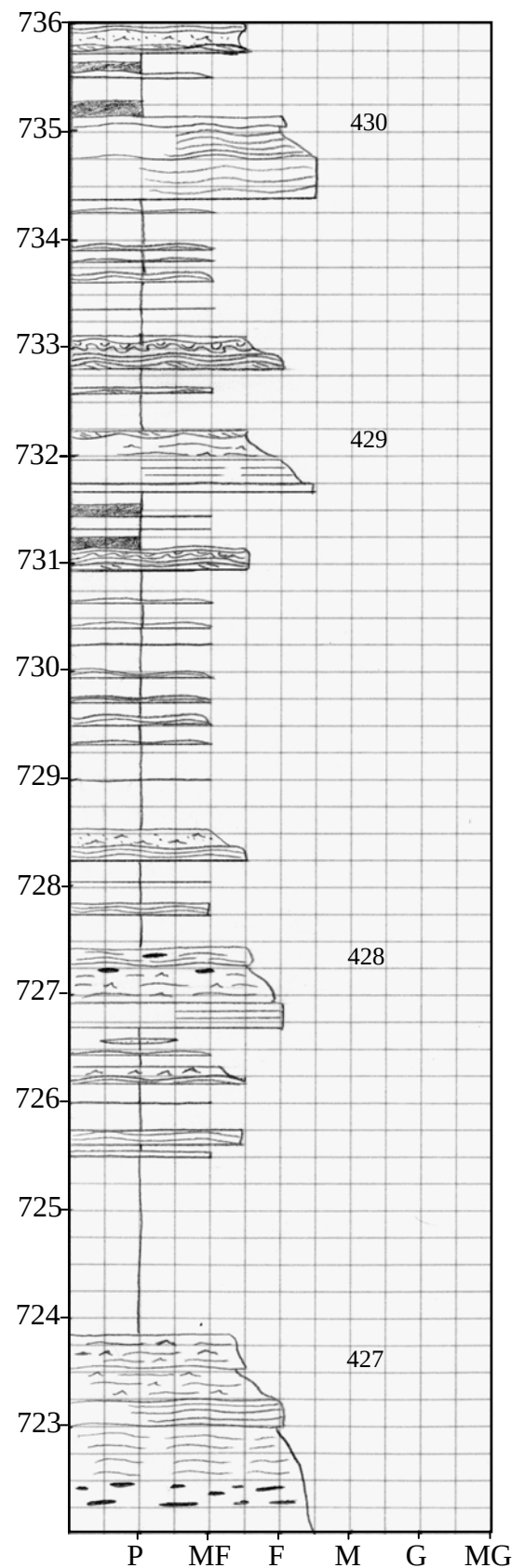
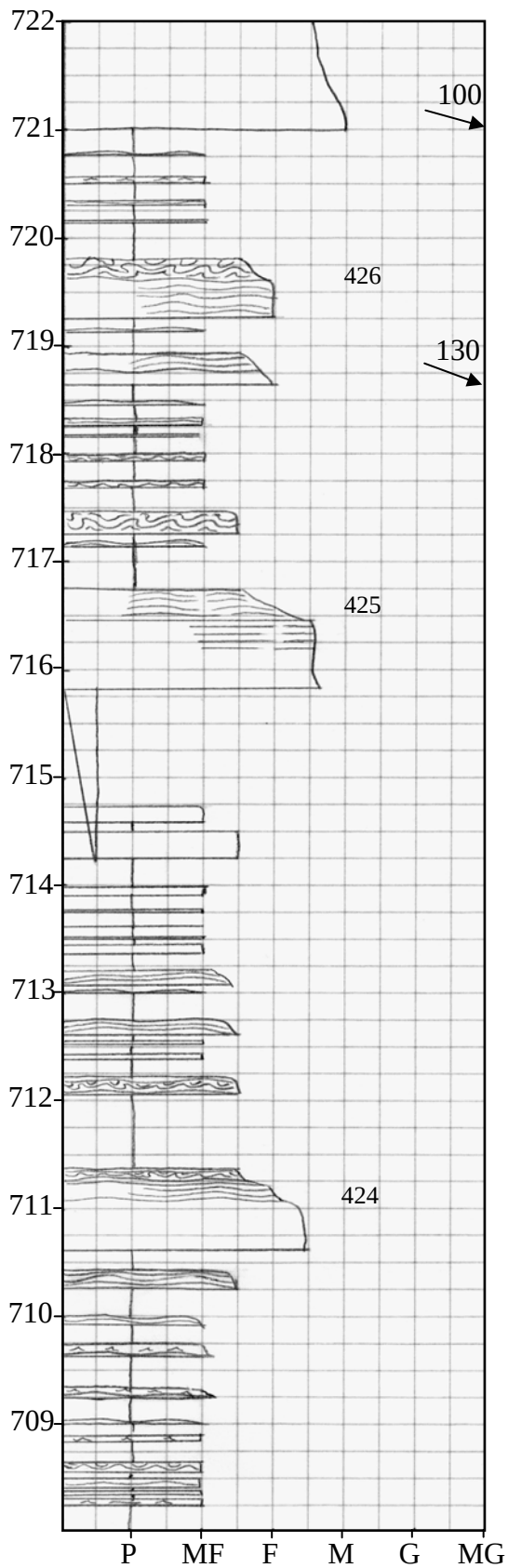
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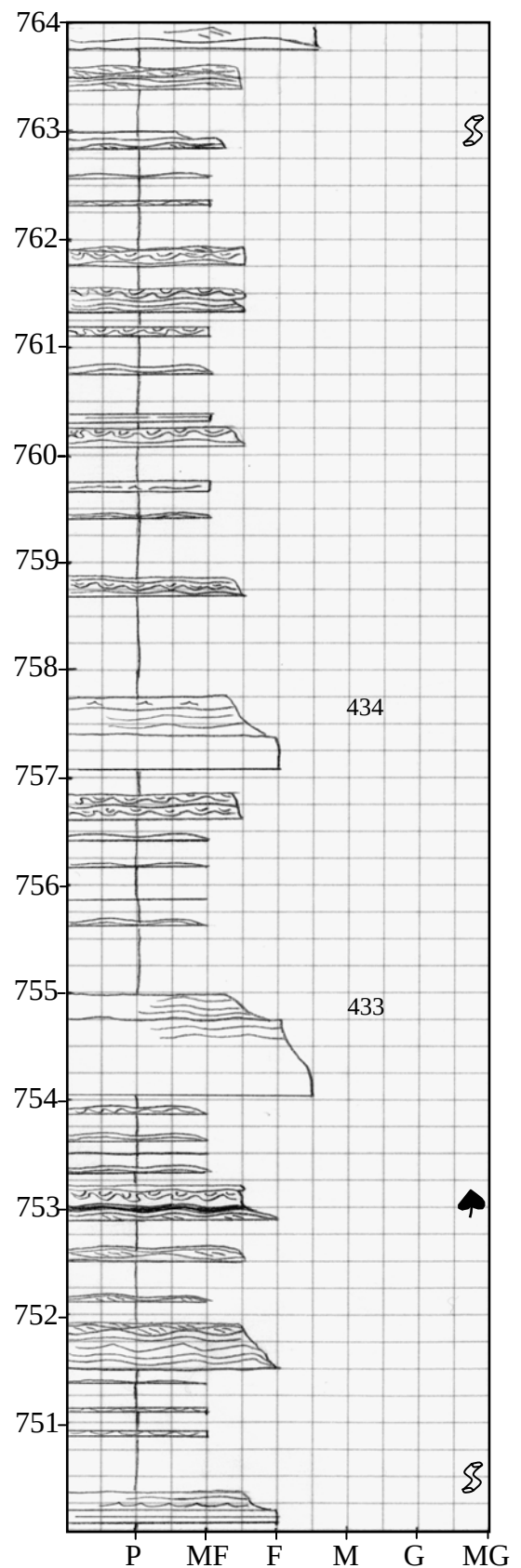
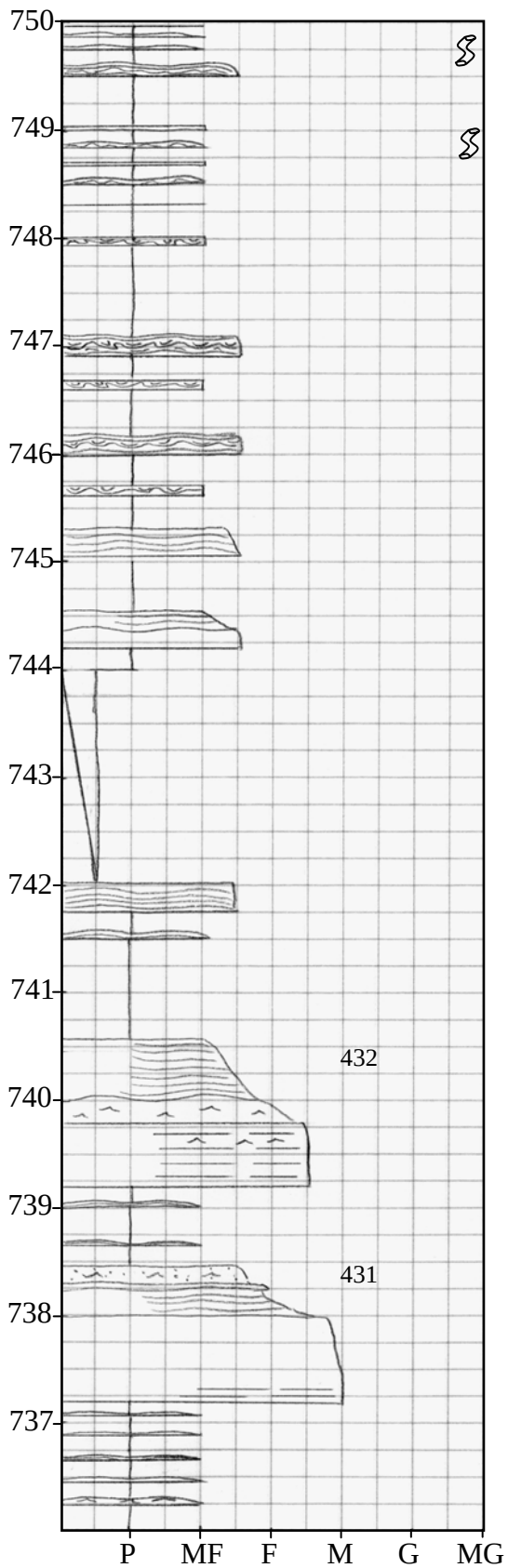
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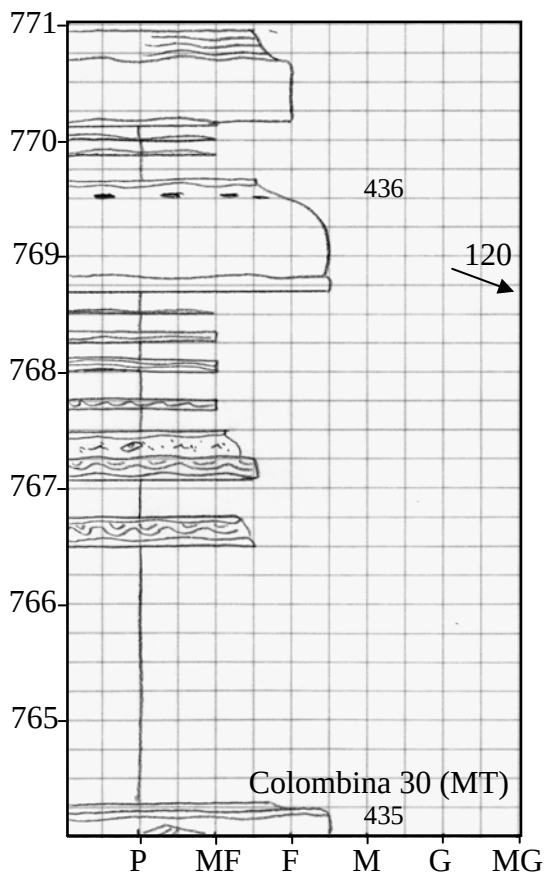
Sezione A



Sezione A



Sezione A



Sezione B

La sezione B, con uno spessore complessivo di 1923 m, è la più lunga delle sezioni misurate. Essa può essere suddivisa in due parti: una inferiore misurata lungo i fiumi Senio e Lozzole e una porzione superiore misurata lungo la strada (Fig. 4). La base della sezione si trova proprio nel bivio tra la strada SP477 (Passo della Sambuca) e quella di Lozzole, nei pressi della località di Acquadalto. Dalla base della sezione, che coincide con il Caotico di Acquadalto, allo strato 280 che è ubicato a circa di 43 al di sopra della Colombina 5, i dati sono stati raccolti in diversi punti sia lungo i fiumi che lungo le strade, come indicato nella figura 4. Lo strato Contessa affiora molto bene sia nel Torrente Lozzole che nel Fiume Senio, al contrario delle strade dove risulta semicoperto (Lozzole) e coperto (SP477). Gli strati tra le colombine 1 e 4, invece, affiorano lungo la strada che va al passo della Sambuca, mentre la Colombina 5 affiora sia sulla strada che va a Piedmonte che sulla strada che va a Lozzole. La successione al di sopra dello strato 280 fino allo strato 486, per uno spessore di circa 770 m di spessore, è stata misurata lungo il Torrente di Lozzole, ed è importante sottolineare che lungo la strada non si osserva alcun affioramento relativo a questo intervallo. A partire dallo strato 486, invece, che affiora nei pressi della località di Maestà delle Valli, la sezione è stata misurata lungo la strada SS477 fino al Passo della Sambuca.

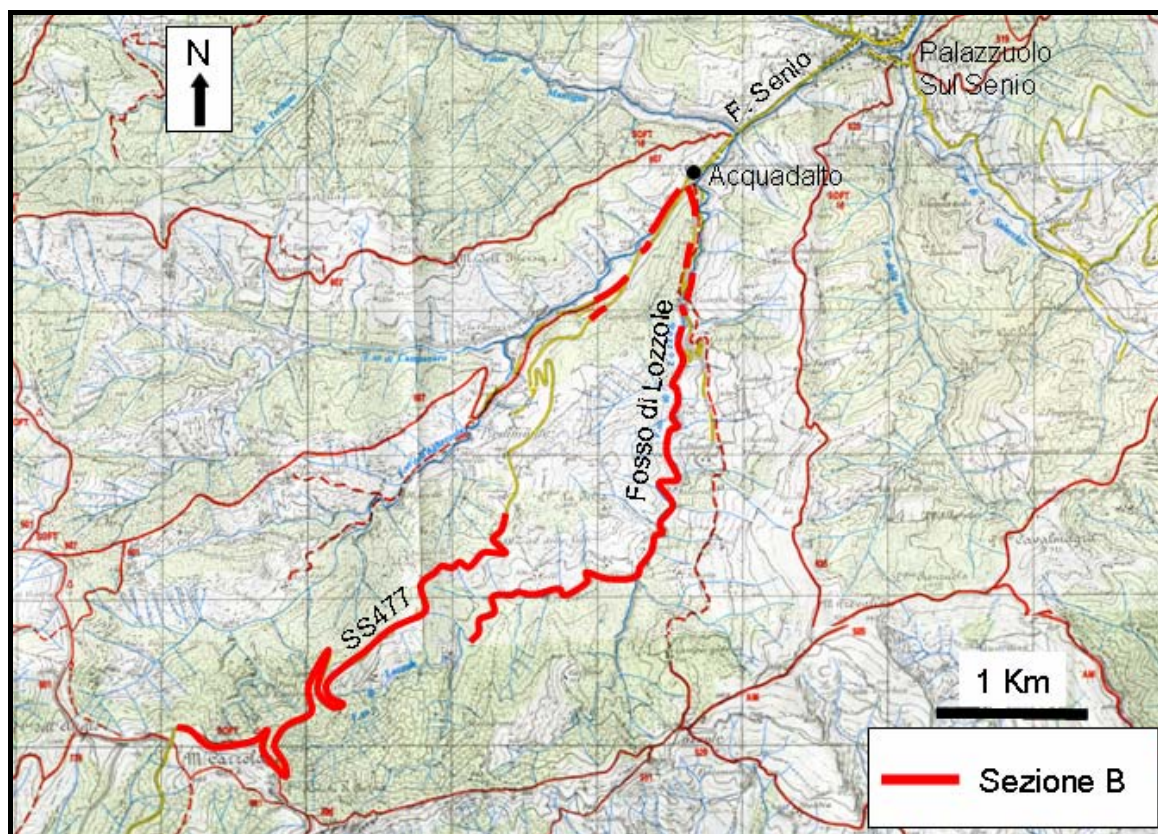
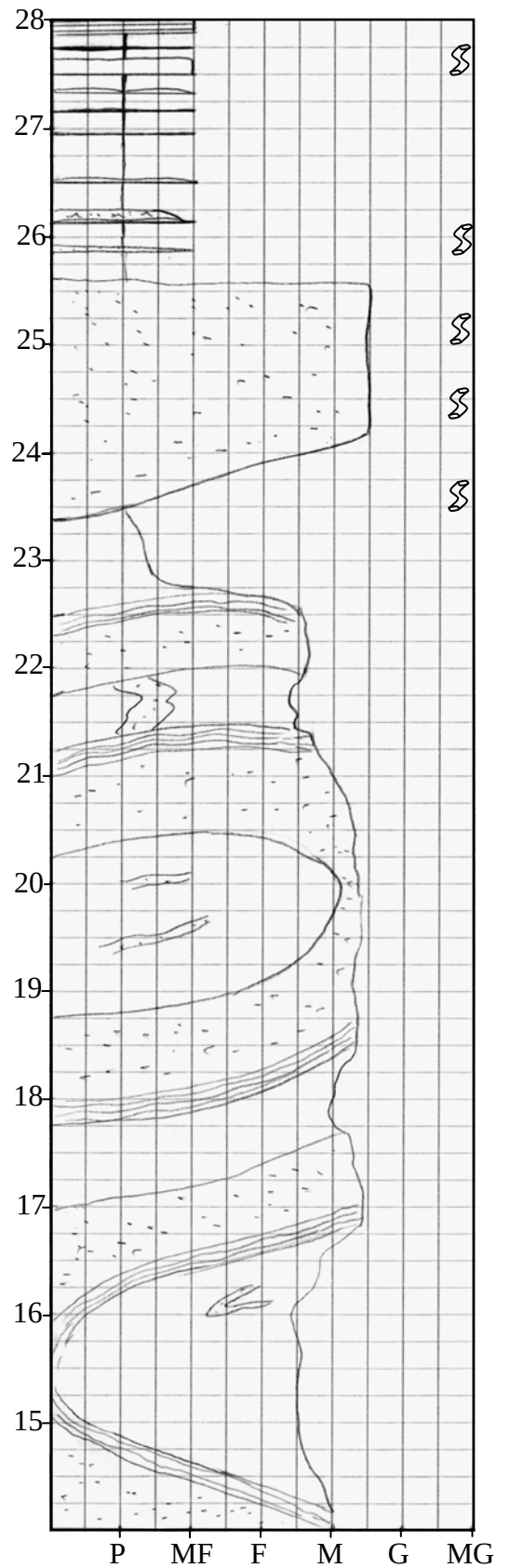
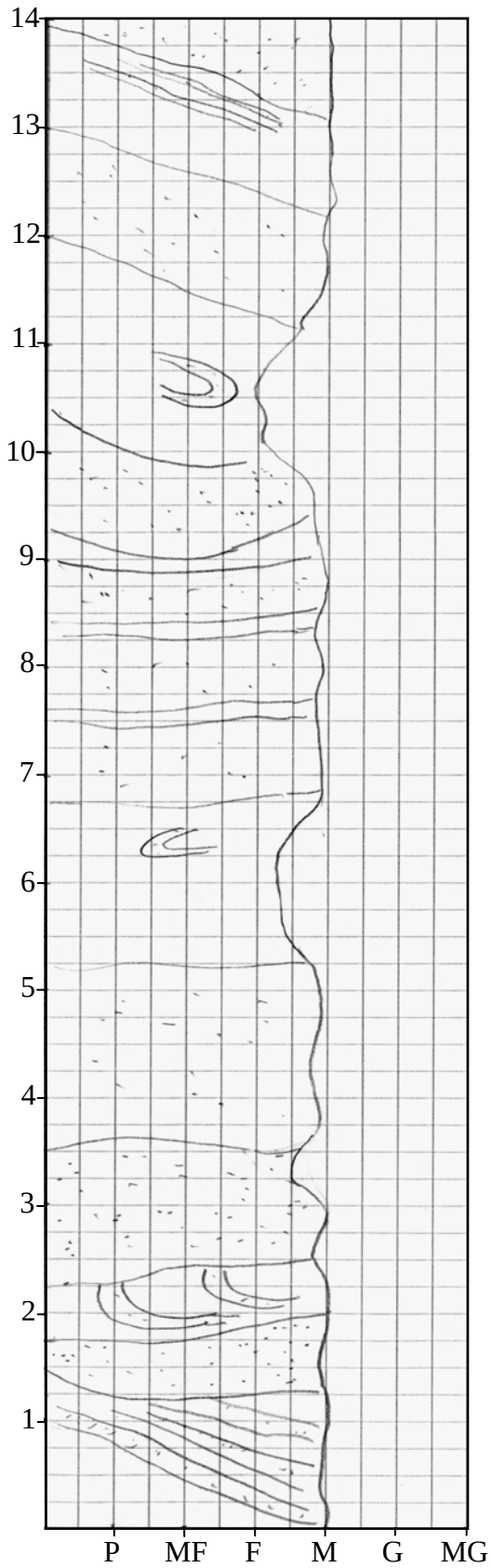
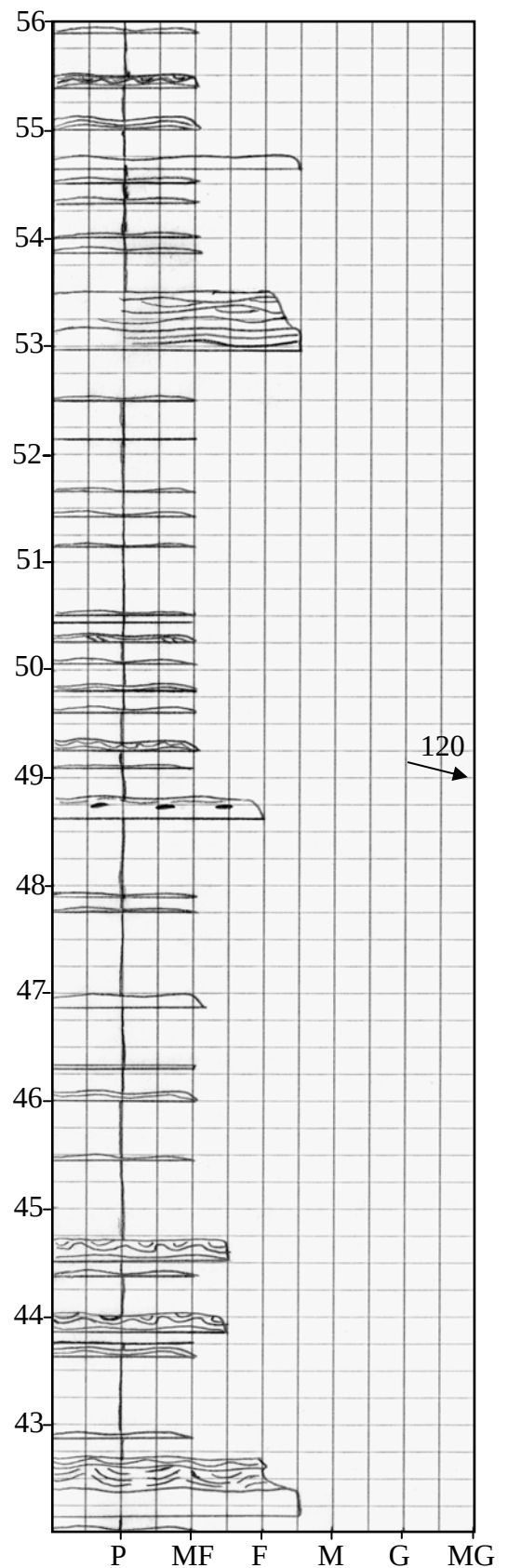
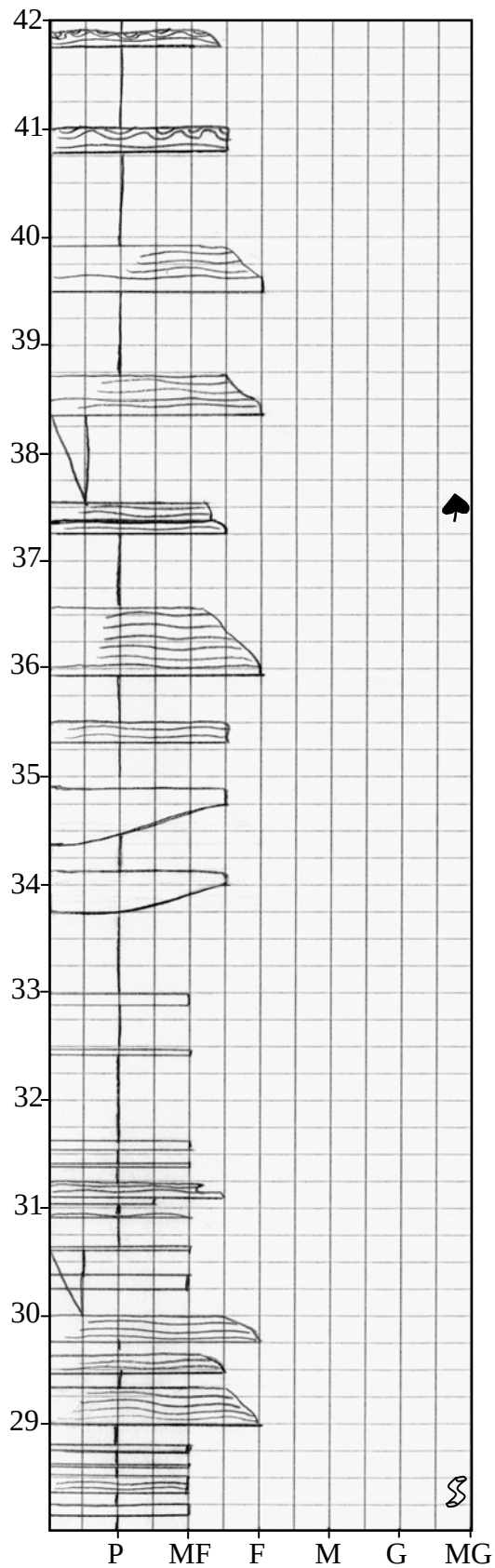


Figura 4- Mappa di localizzazione della sezione B, Valle del Senio.

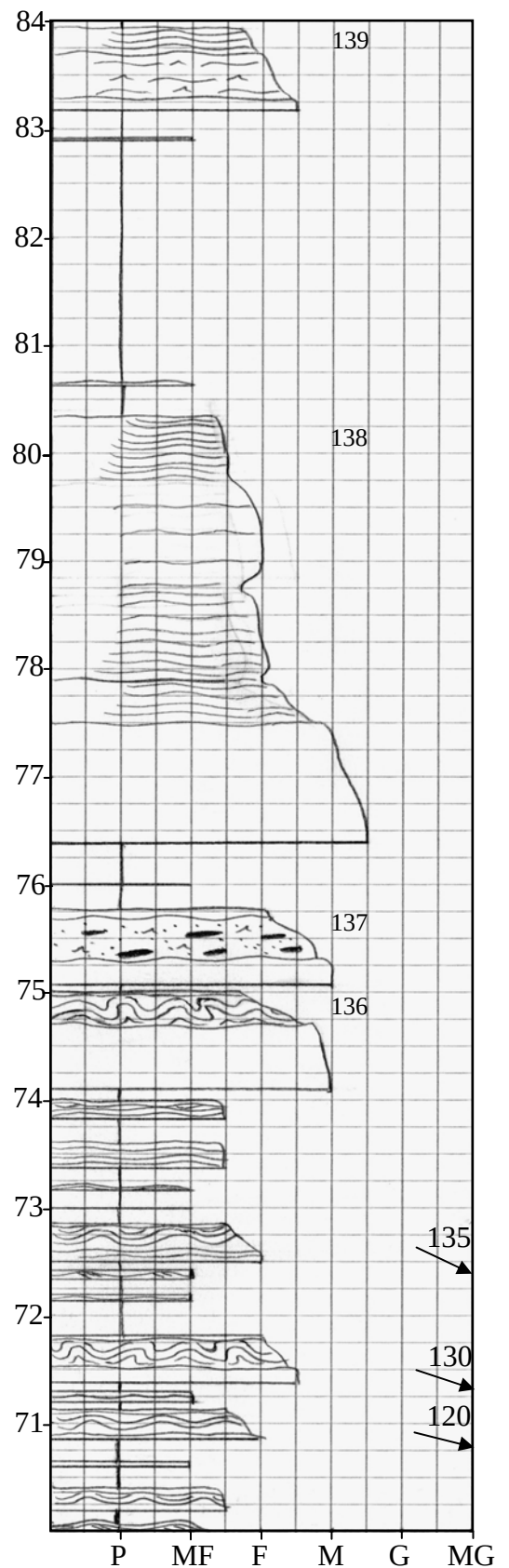
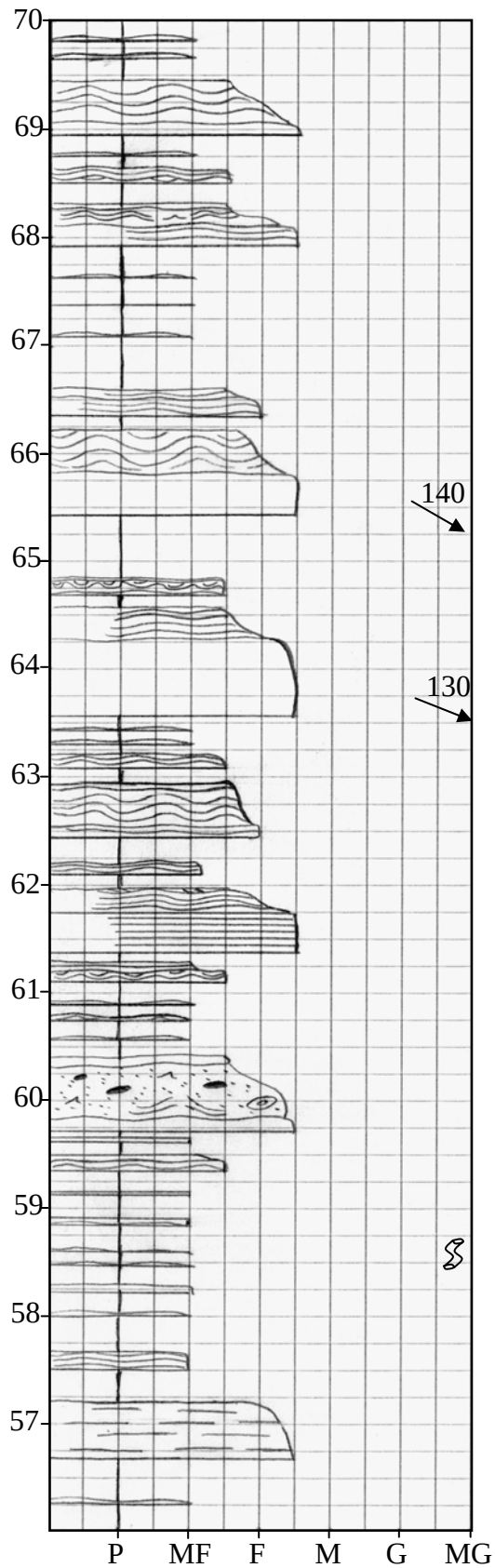
Sezione B



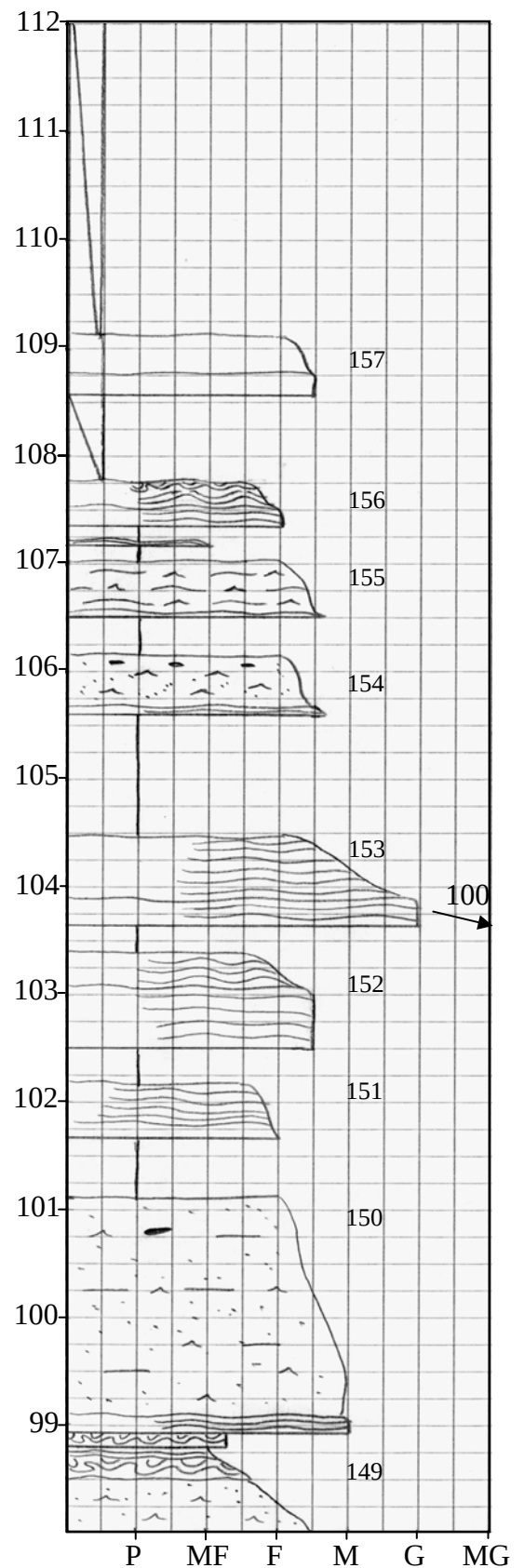
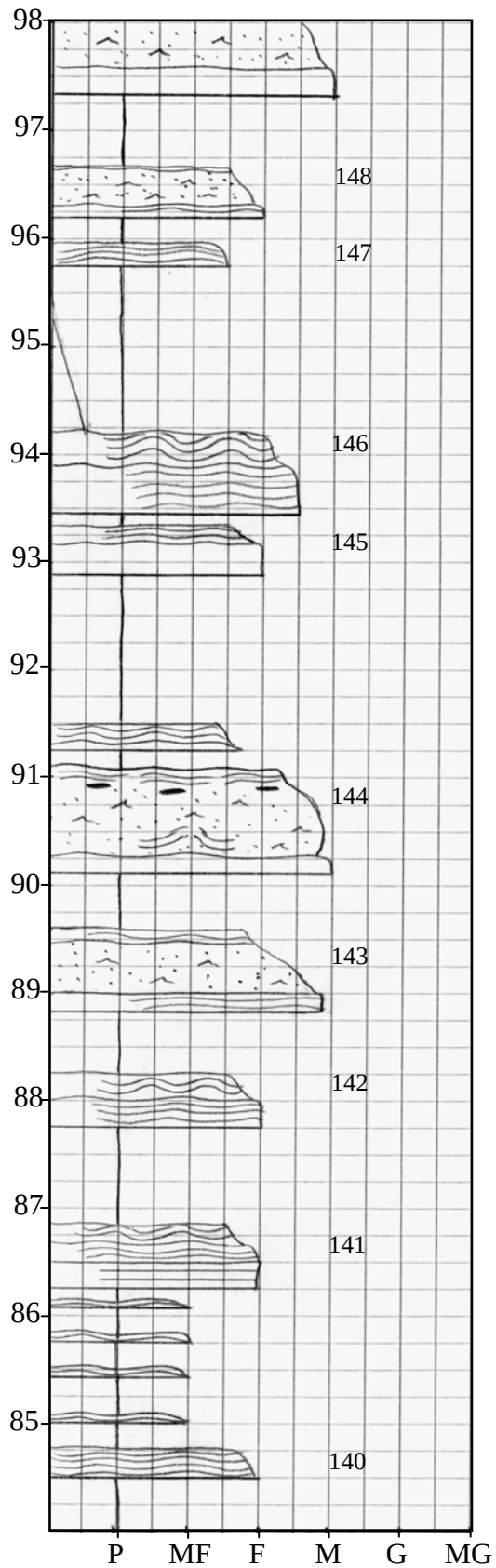
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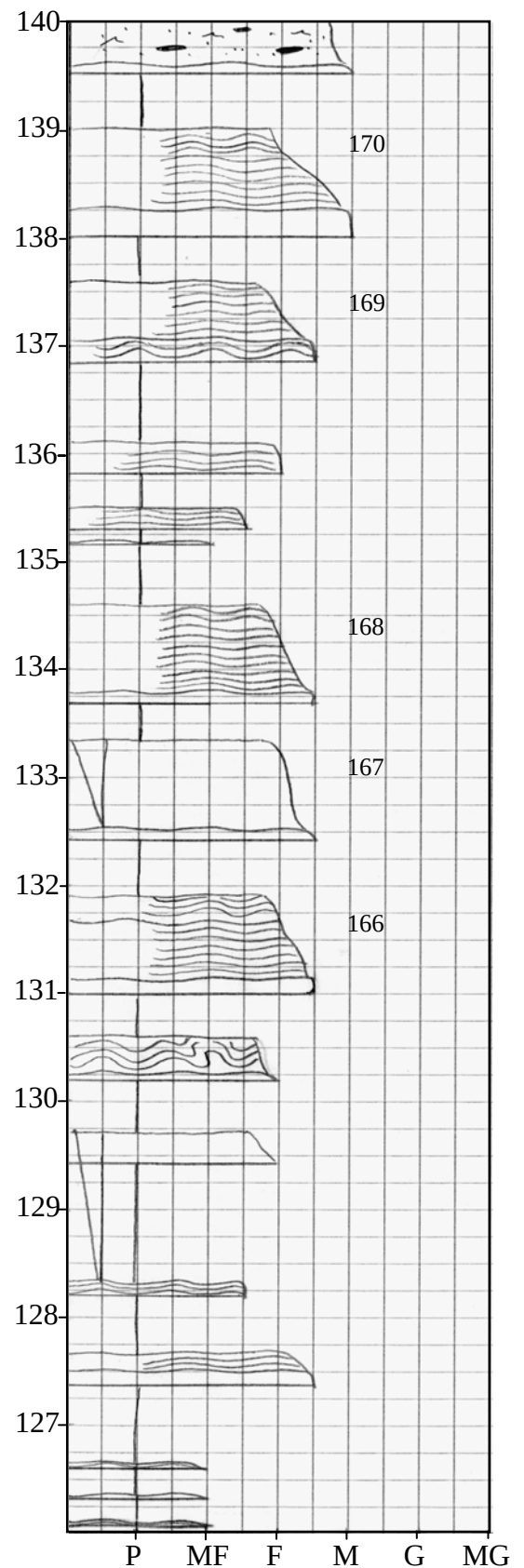
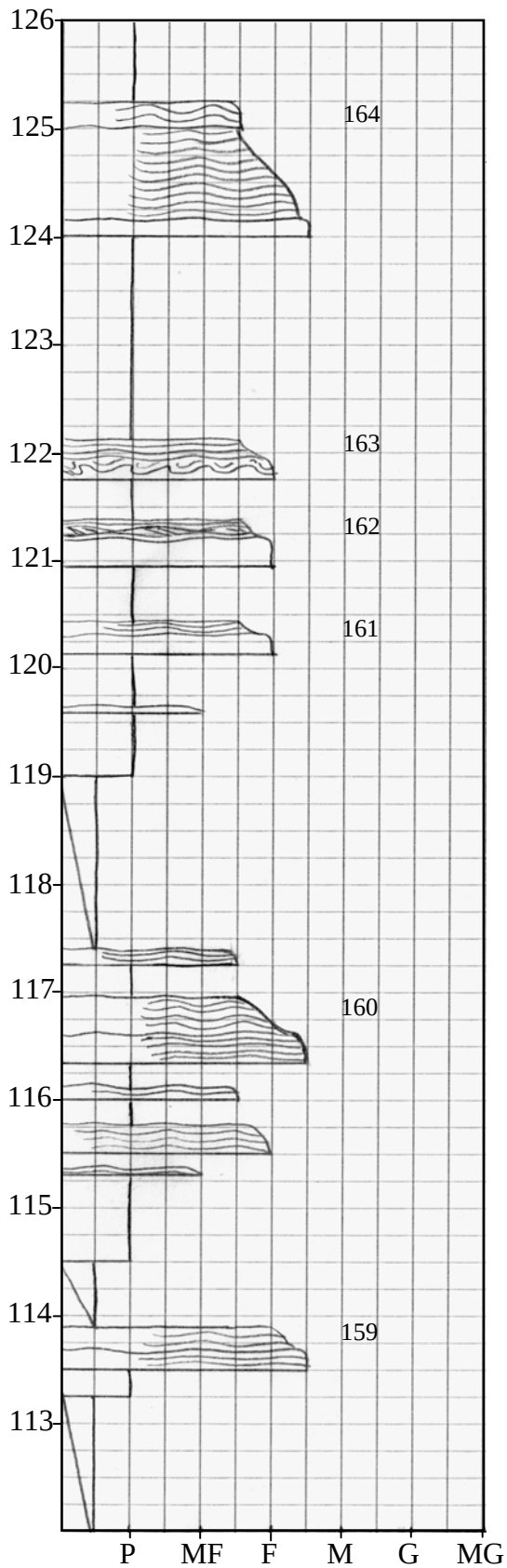
Sezione B



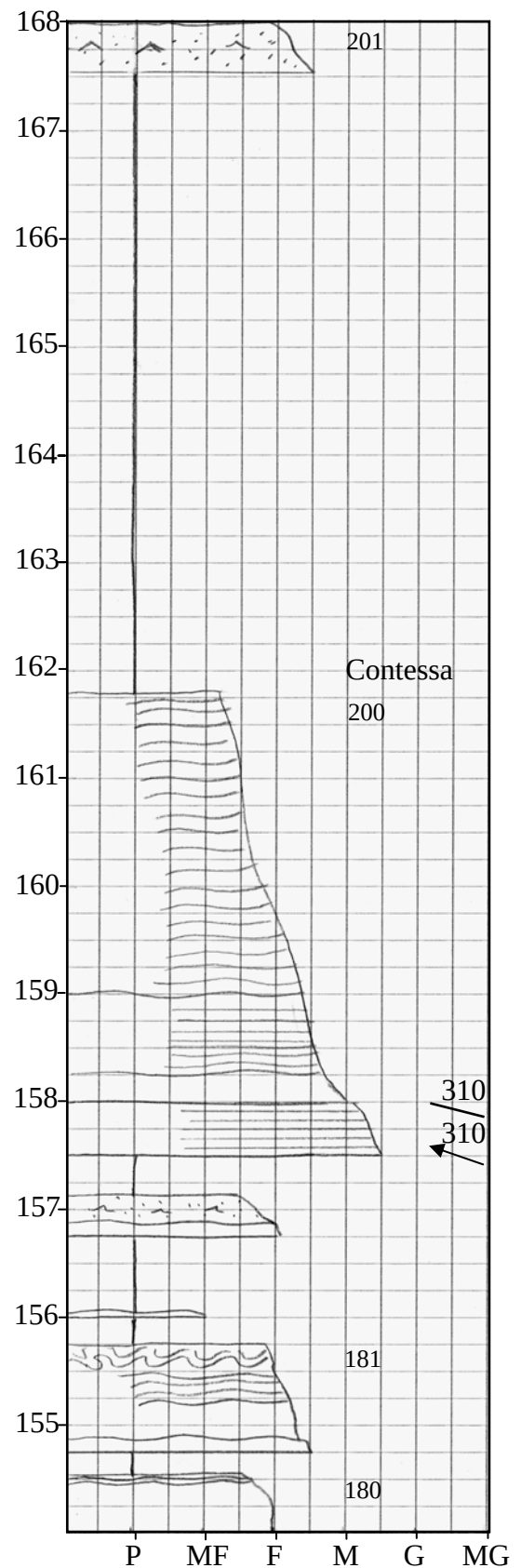
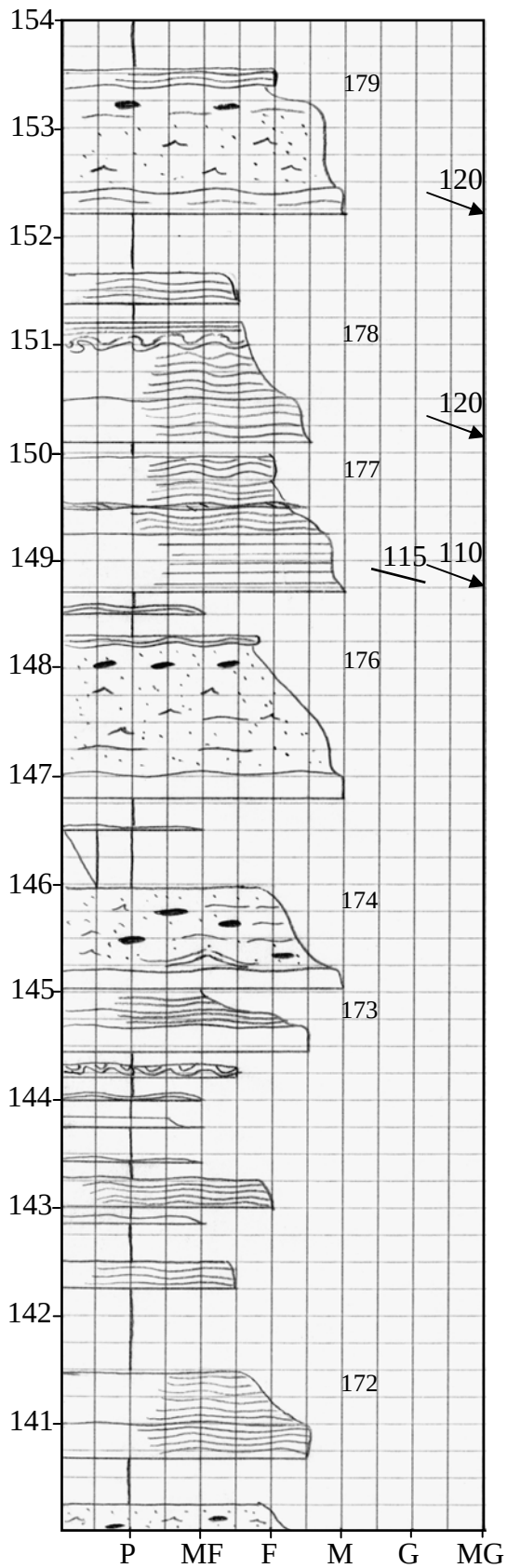
Sezione B



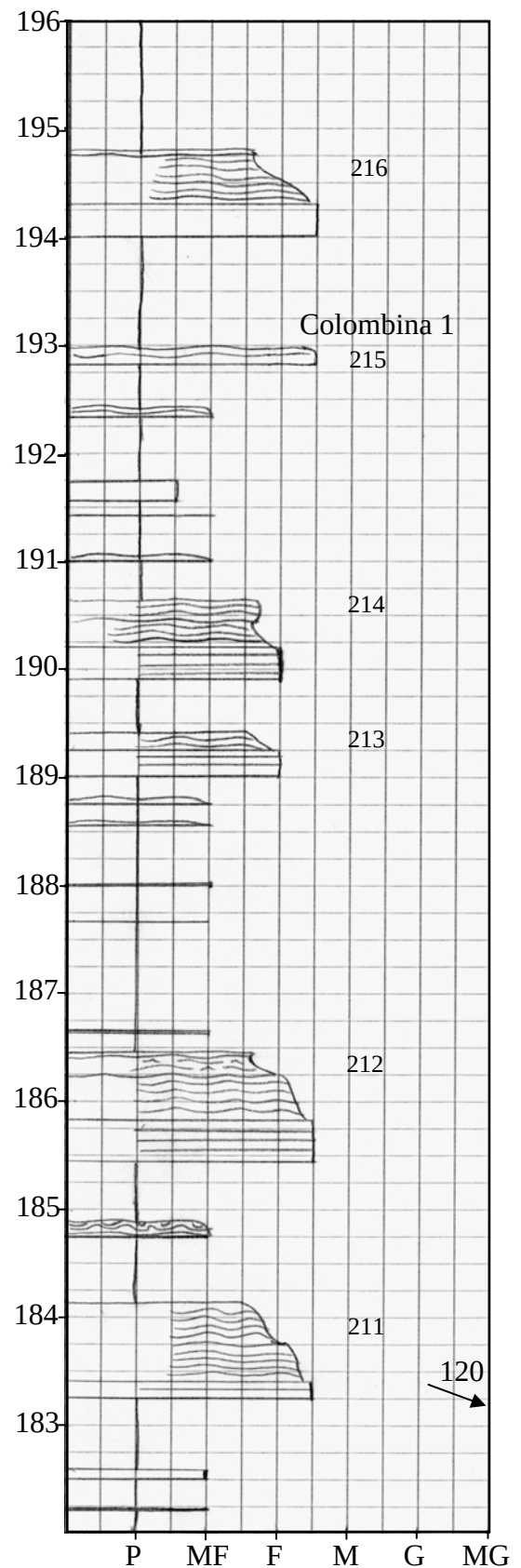
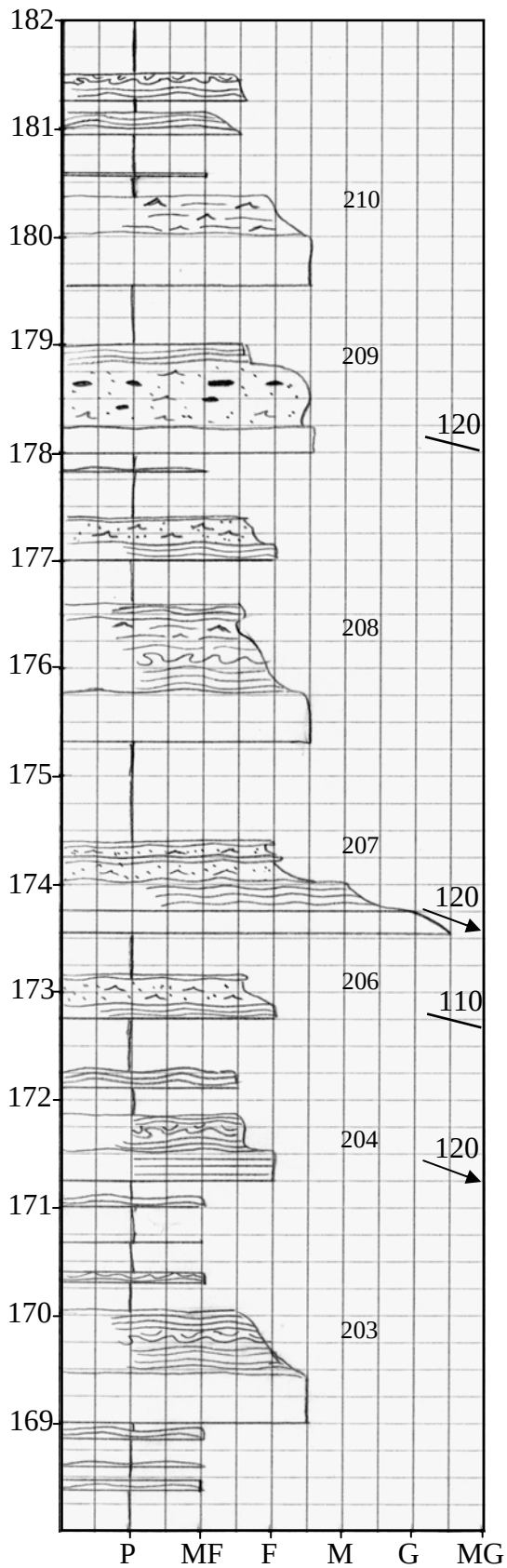
Sezione B



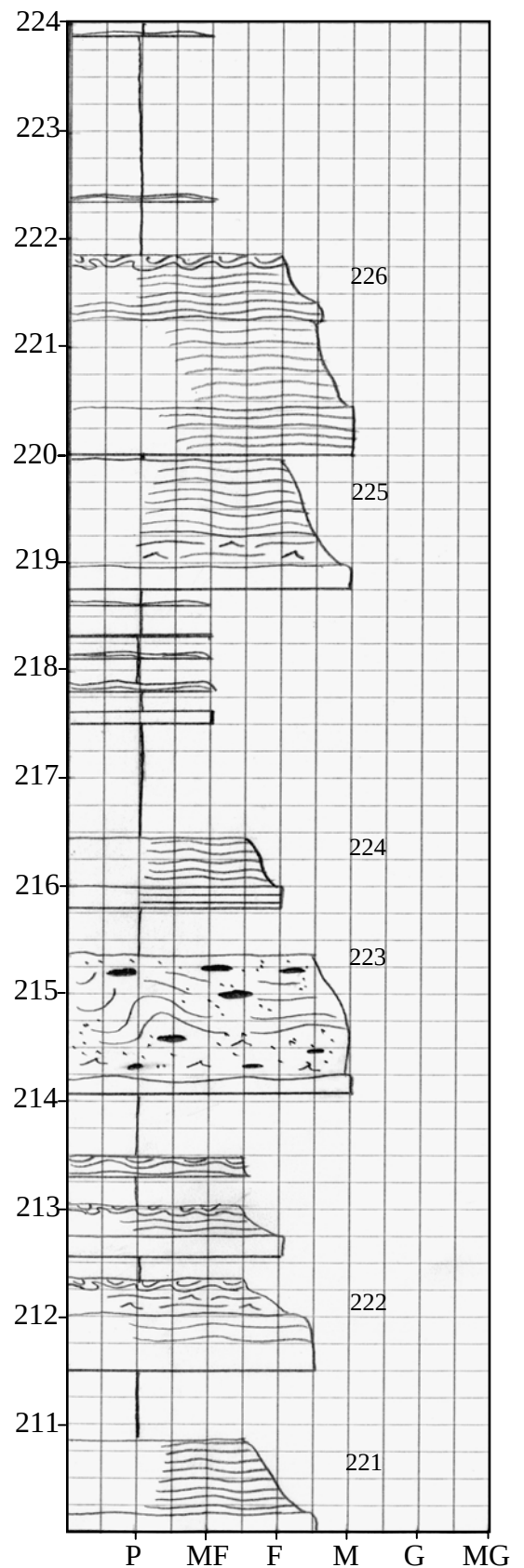
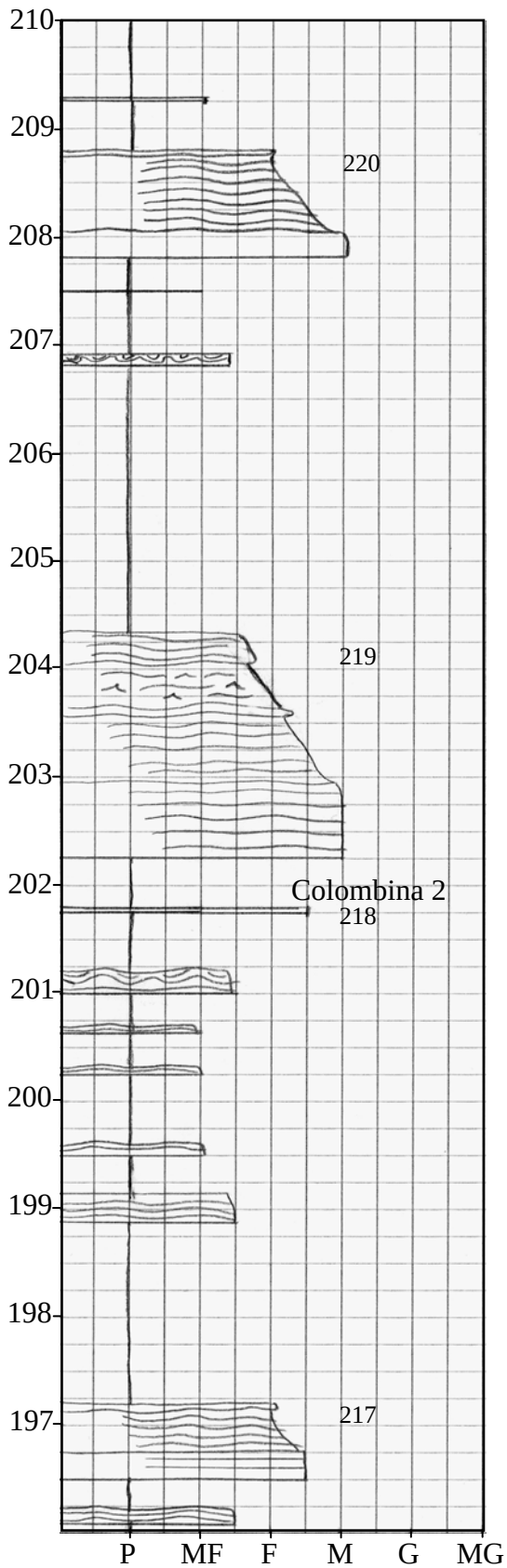
Sezione B



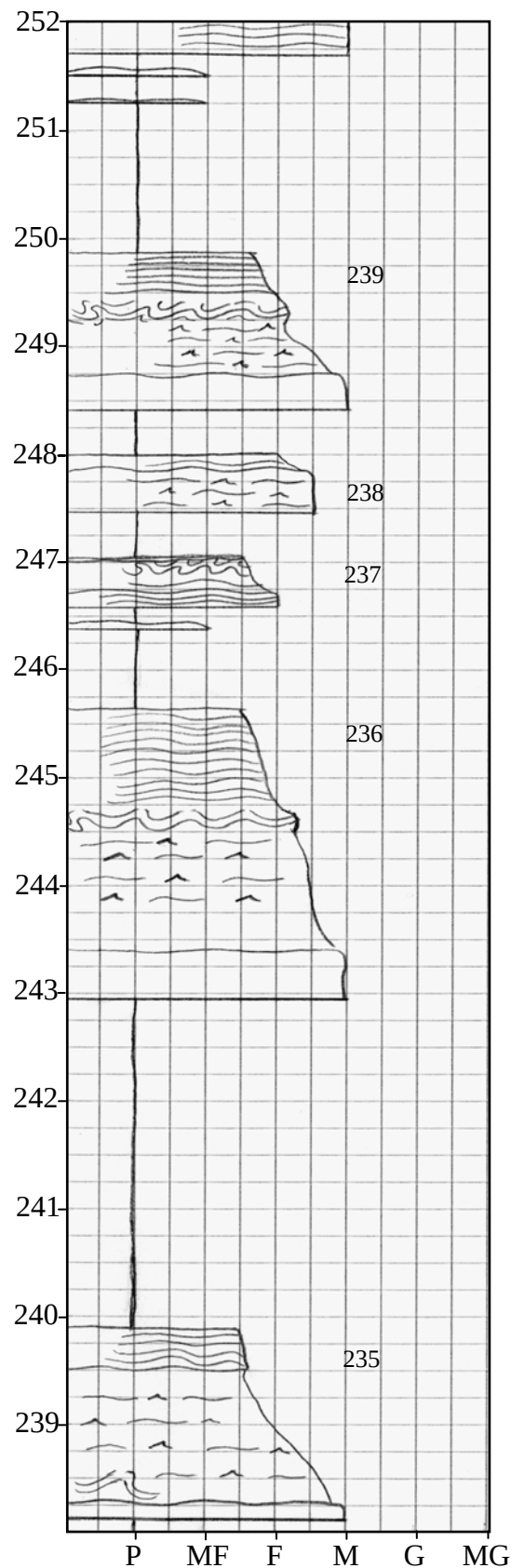
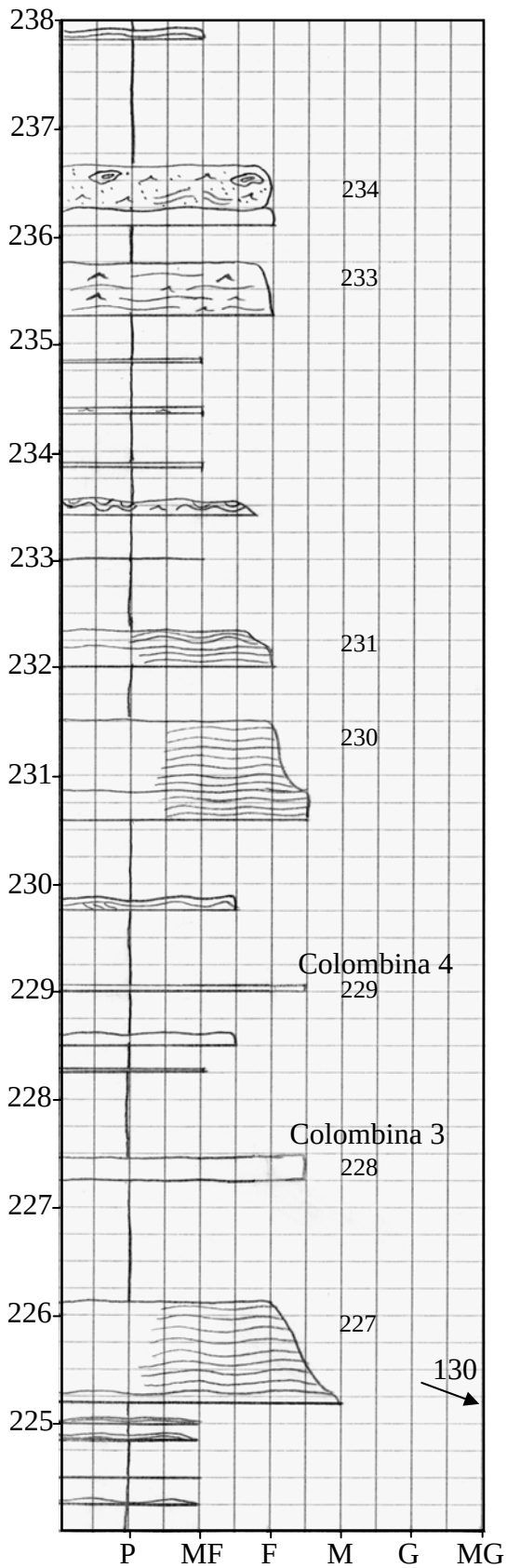
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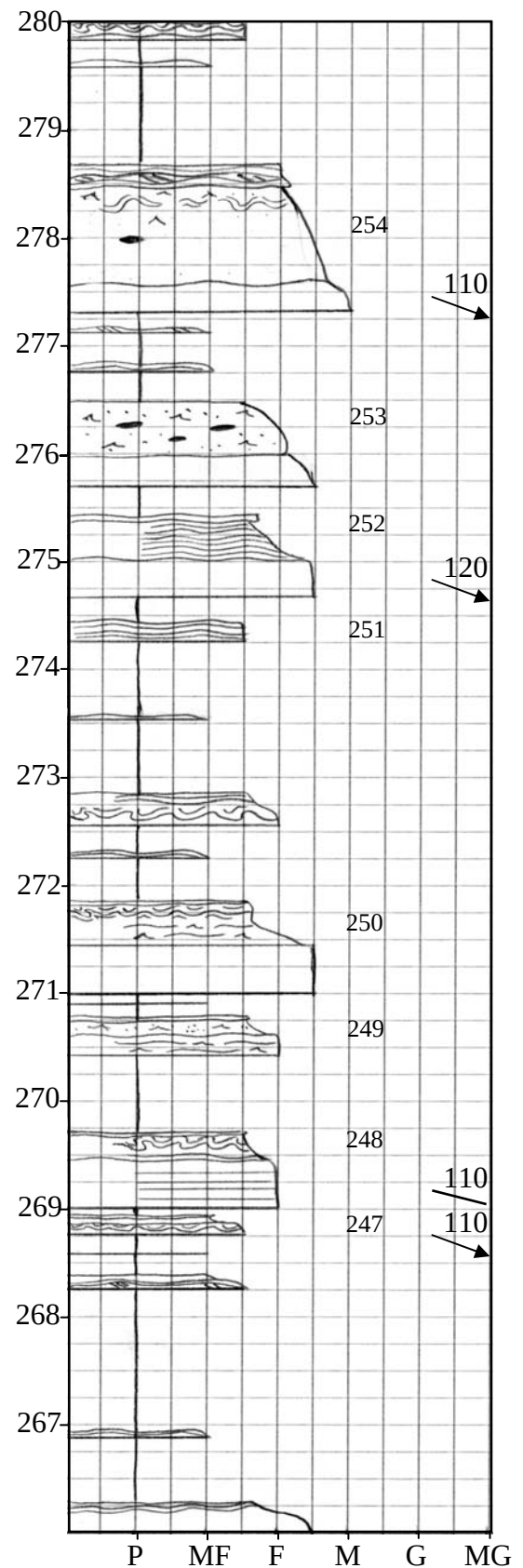
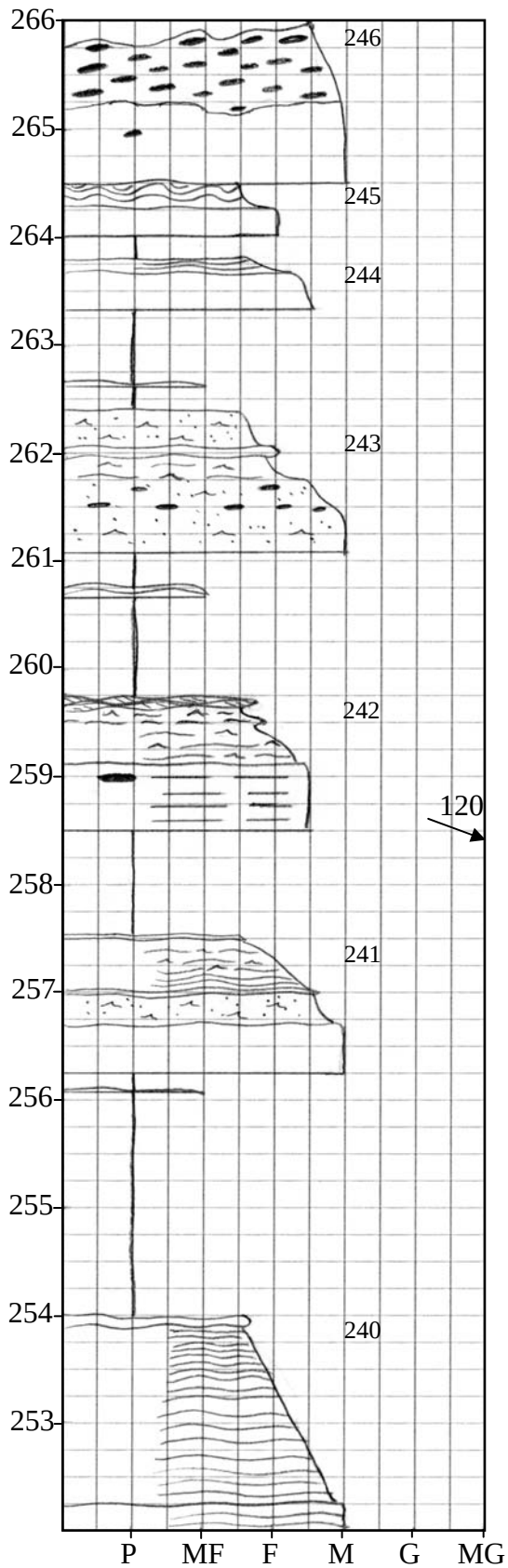
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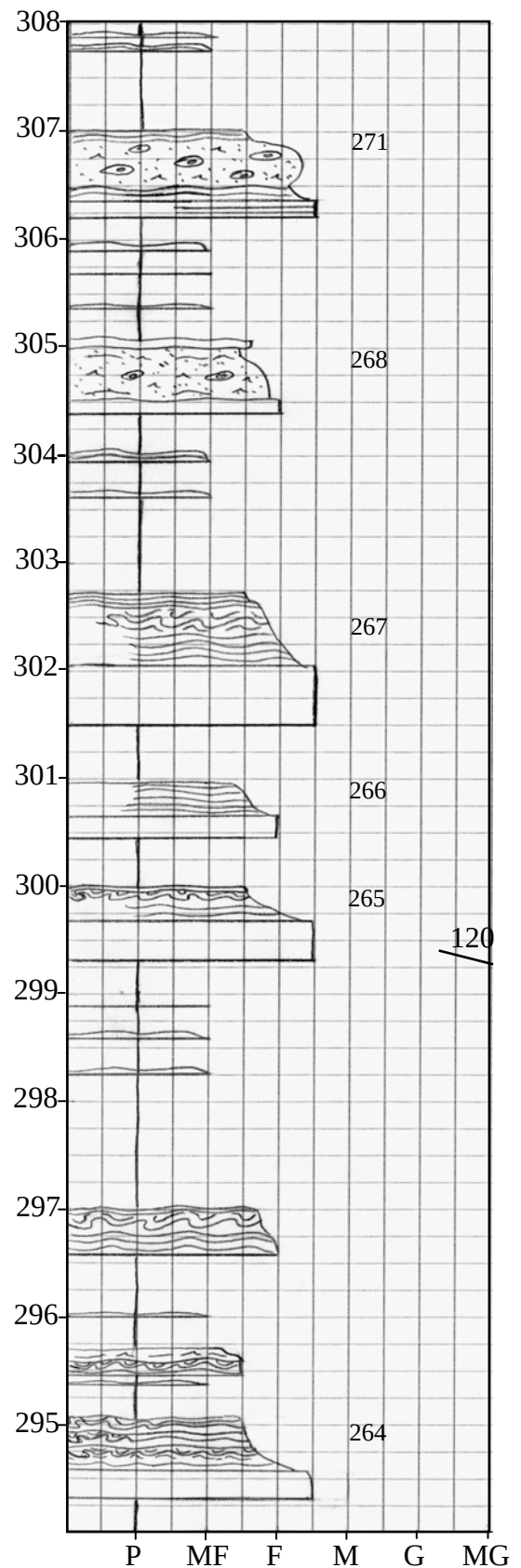
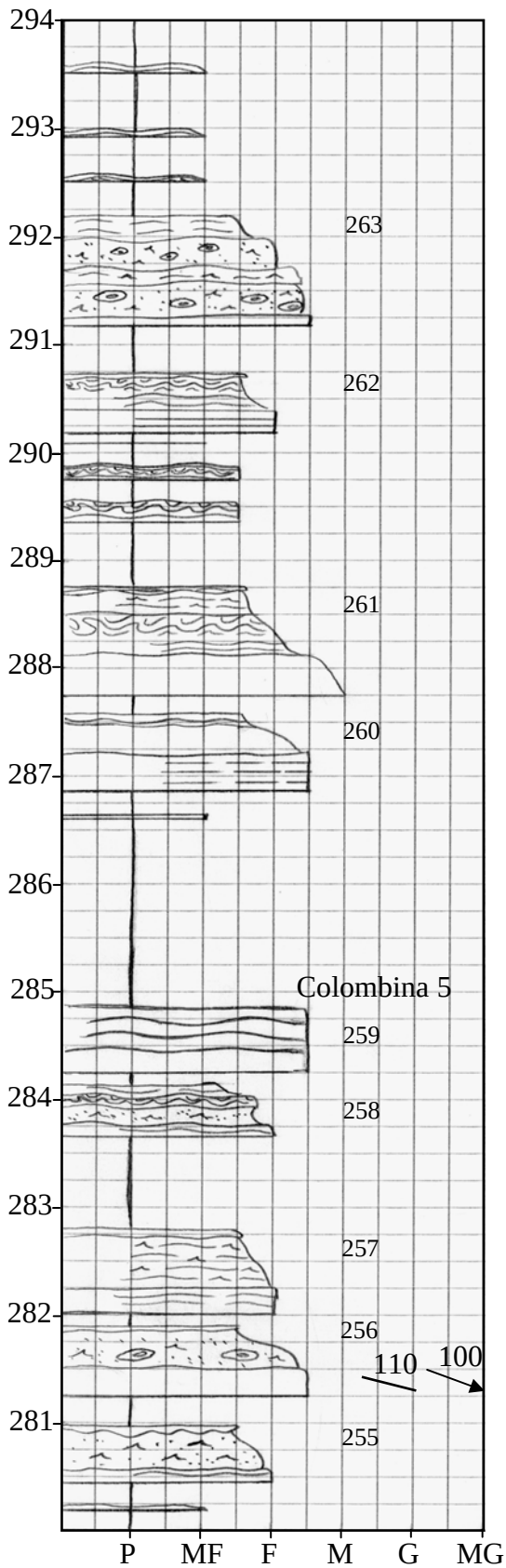
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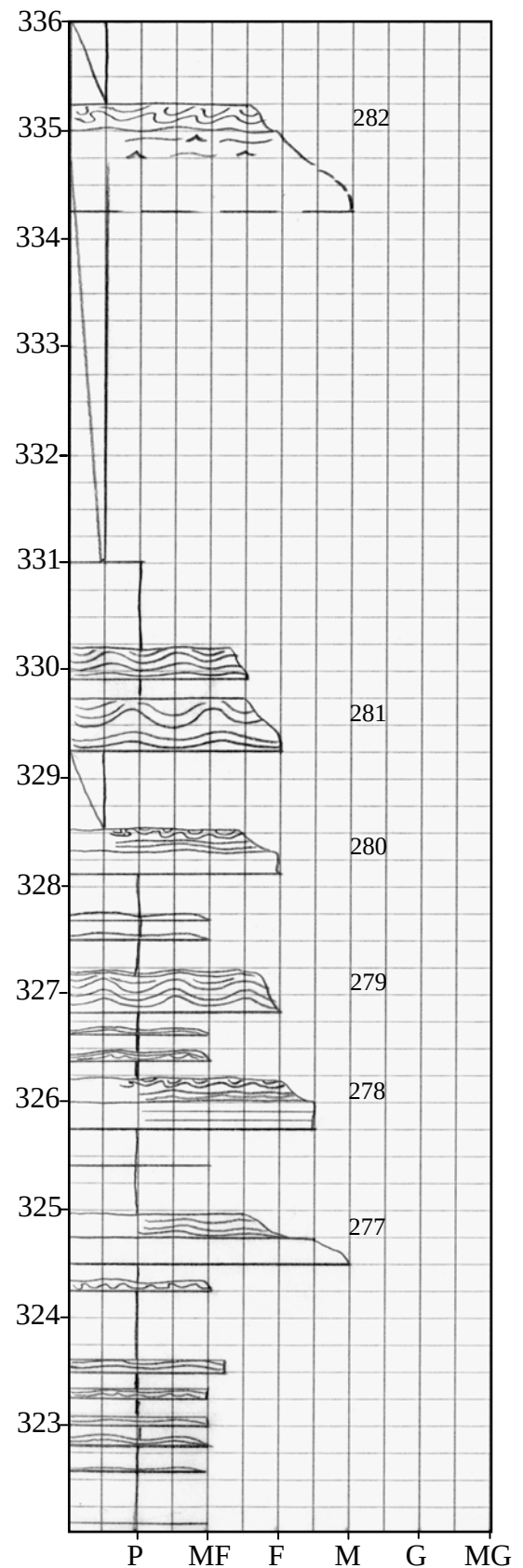
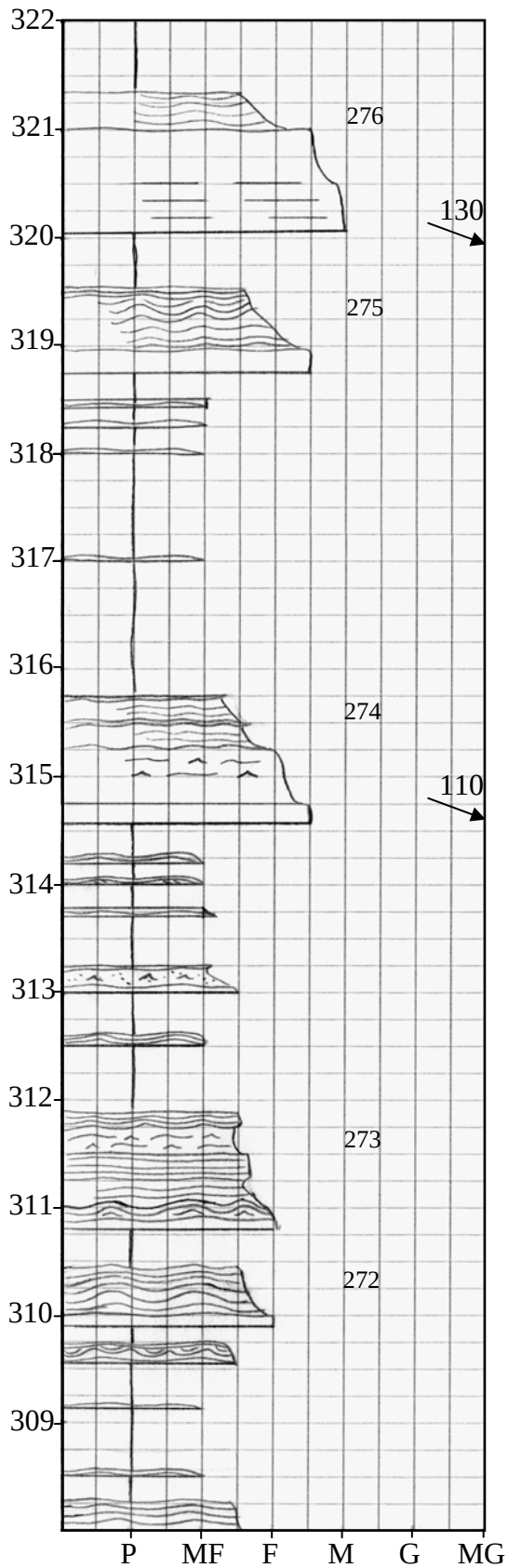
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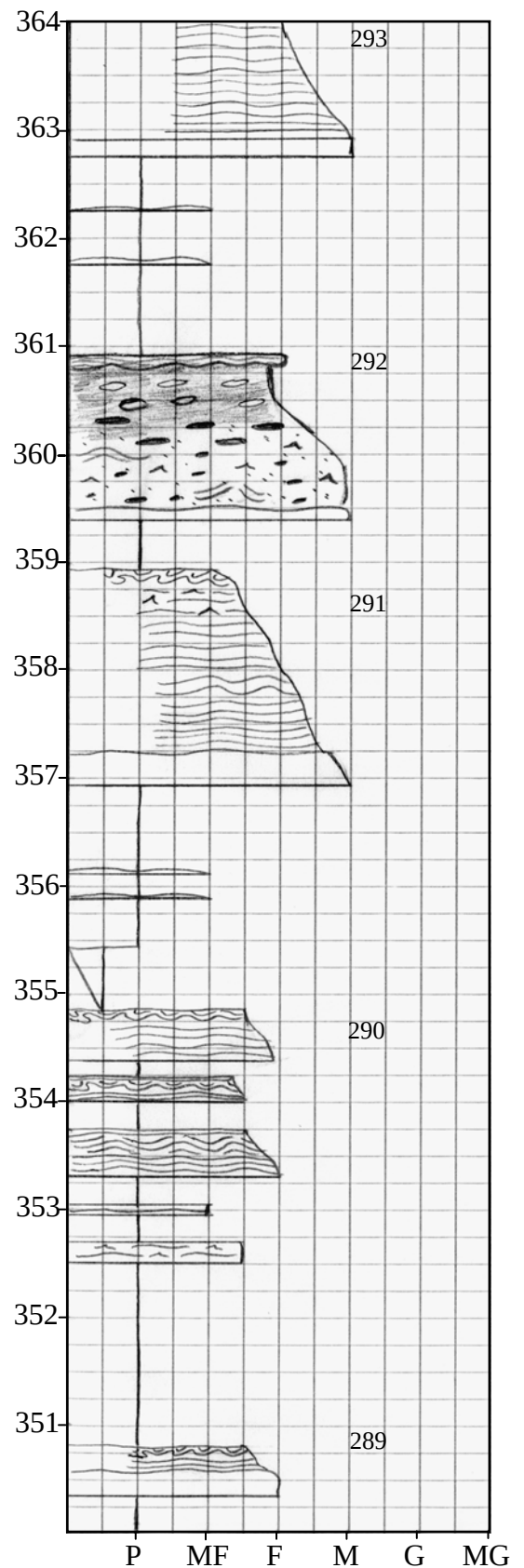
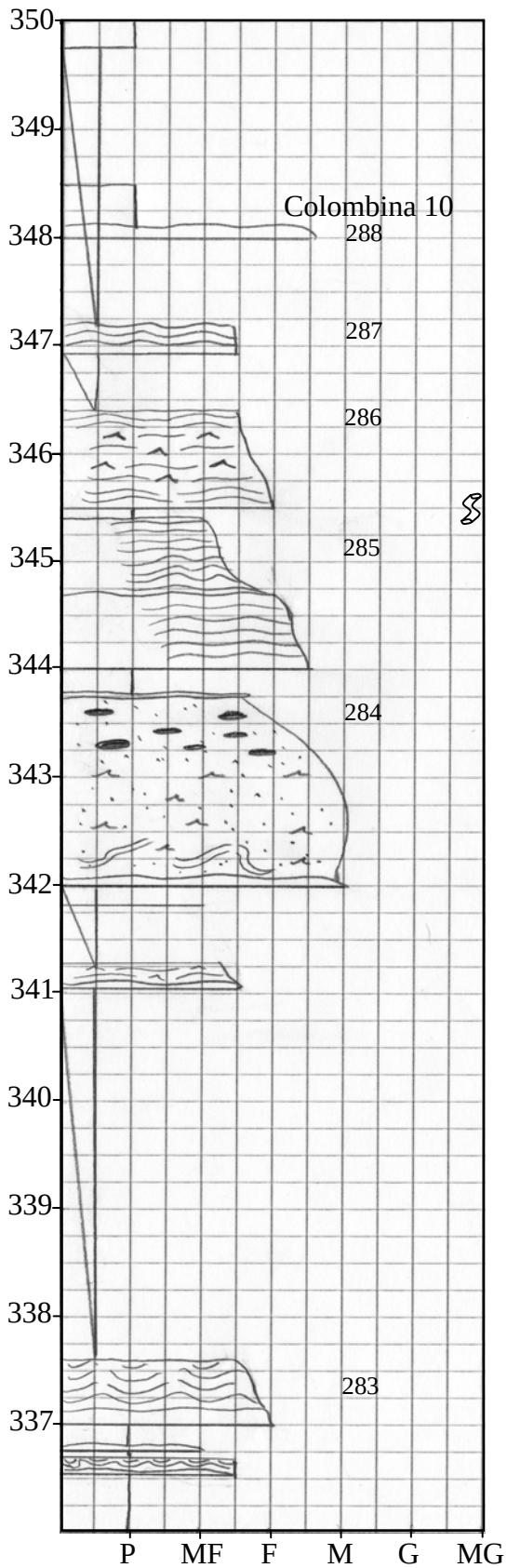
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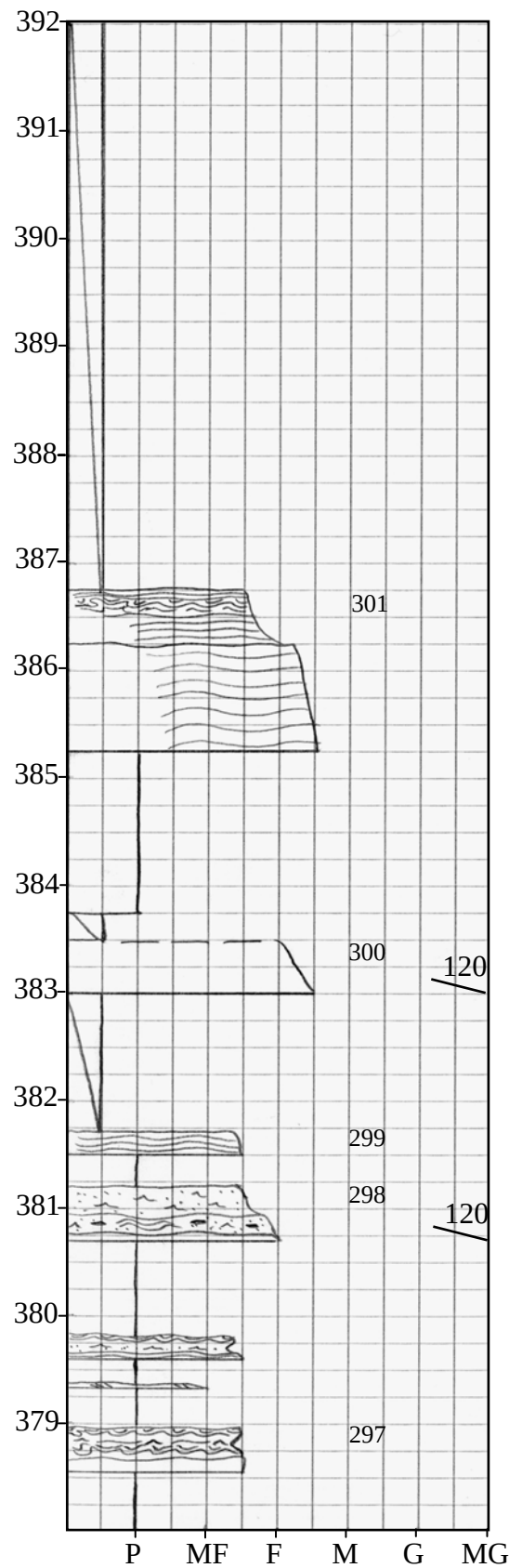
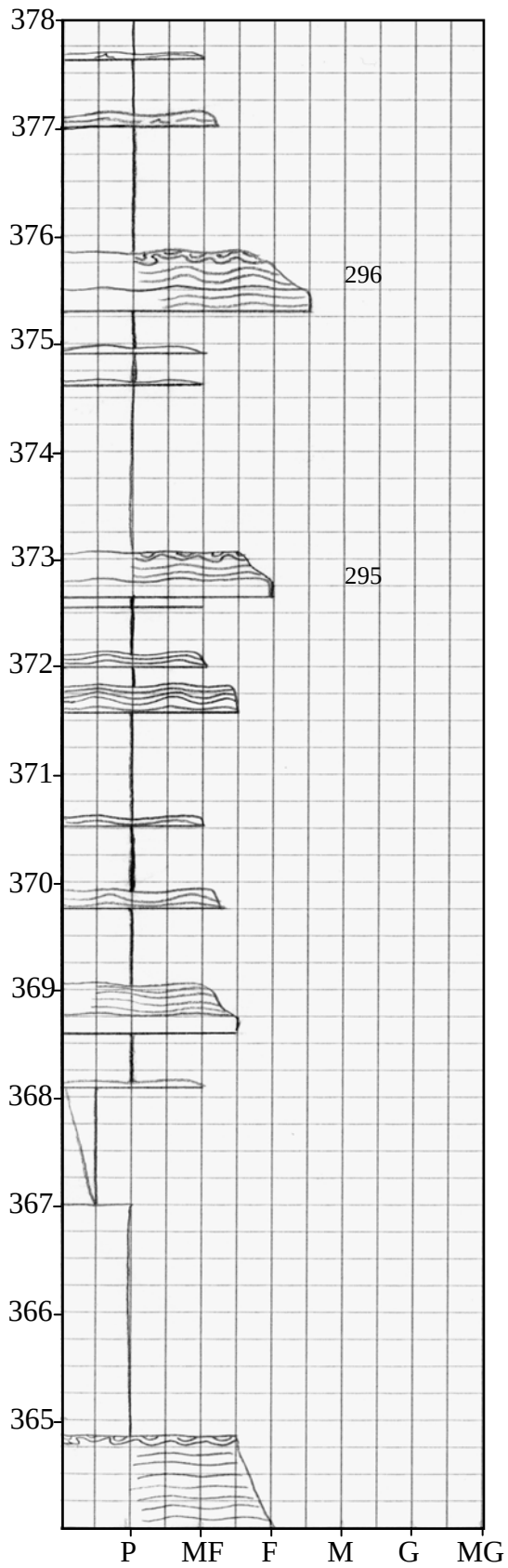
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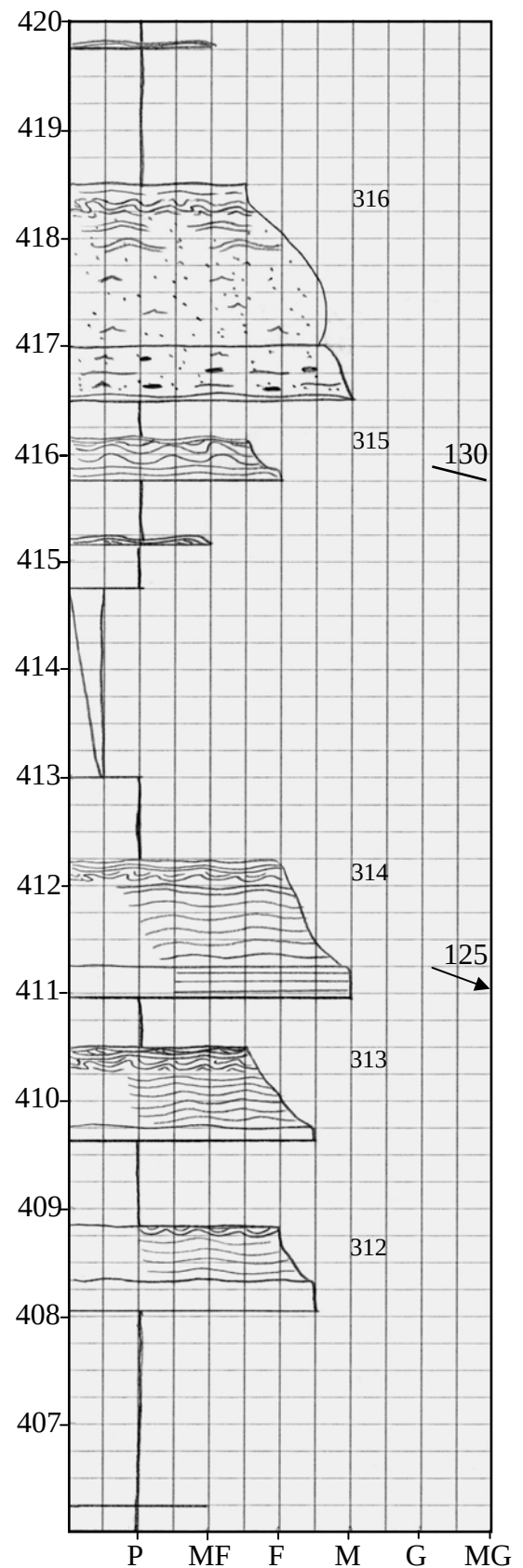
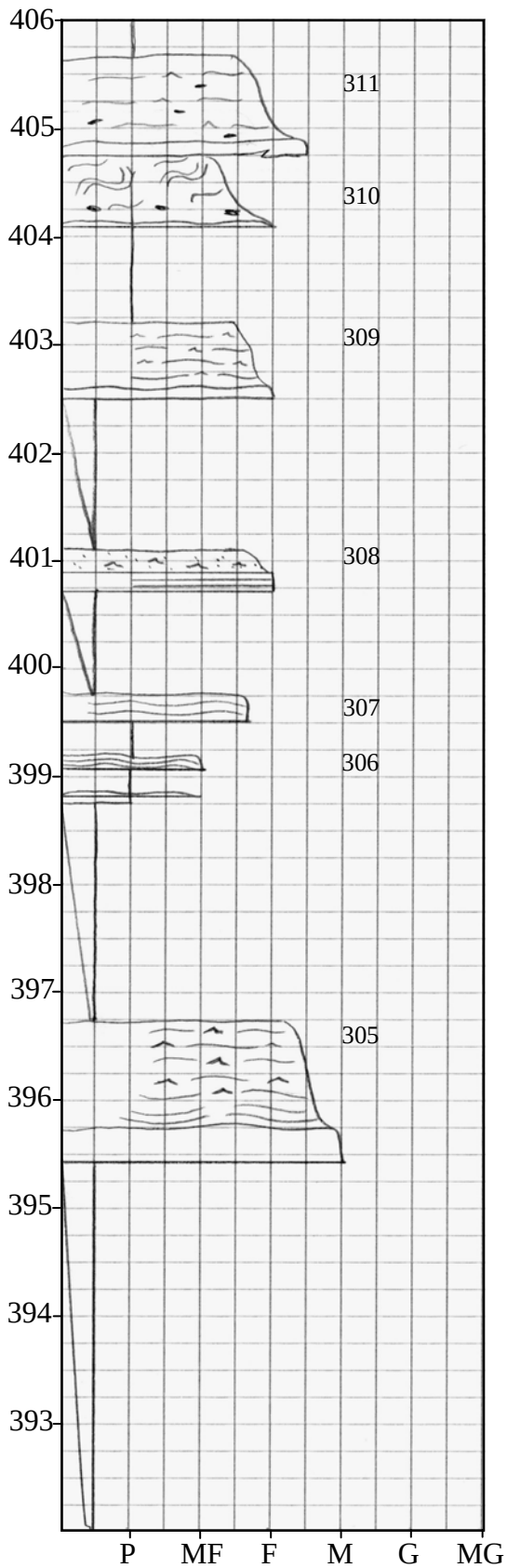
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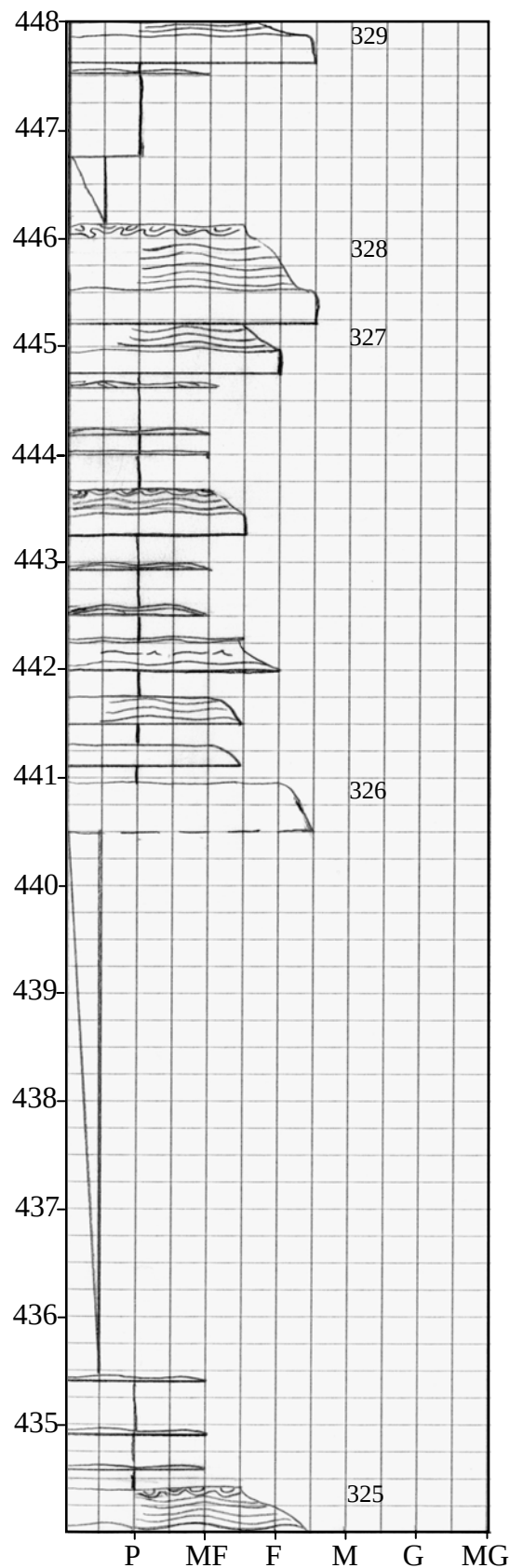
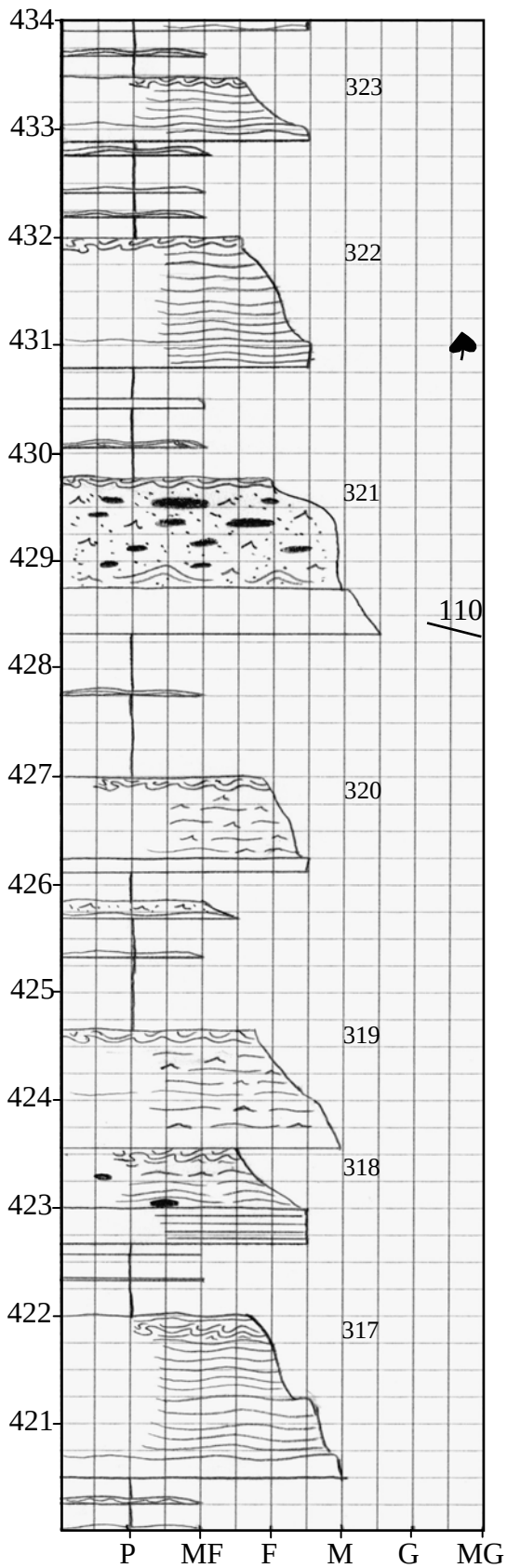
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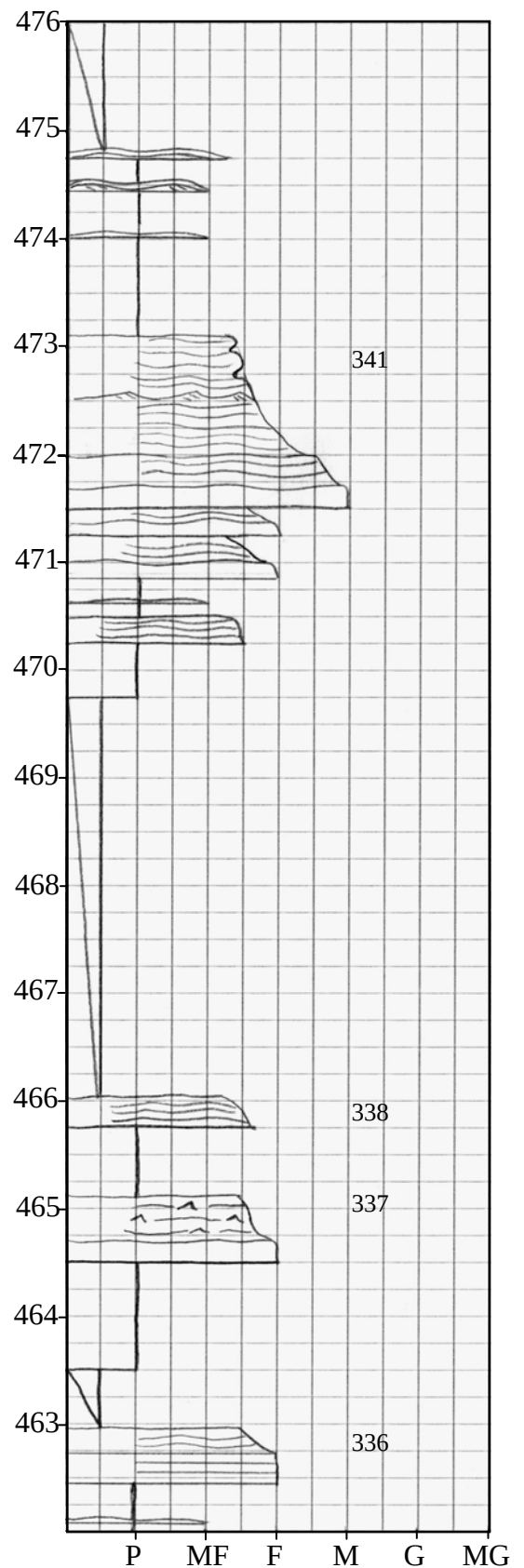
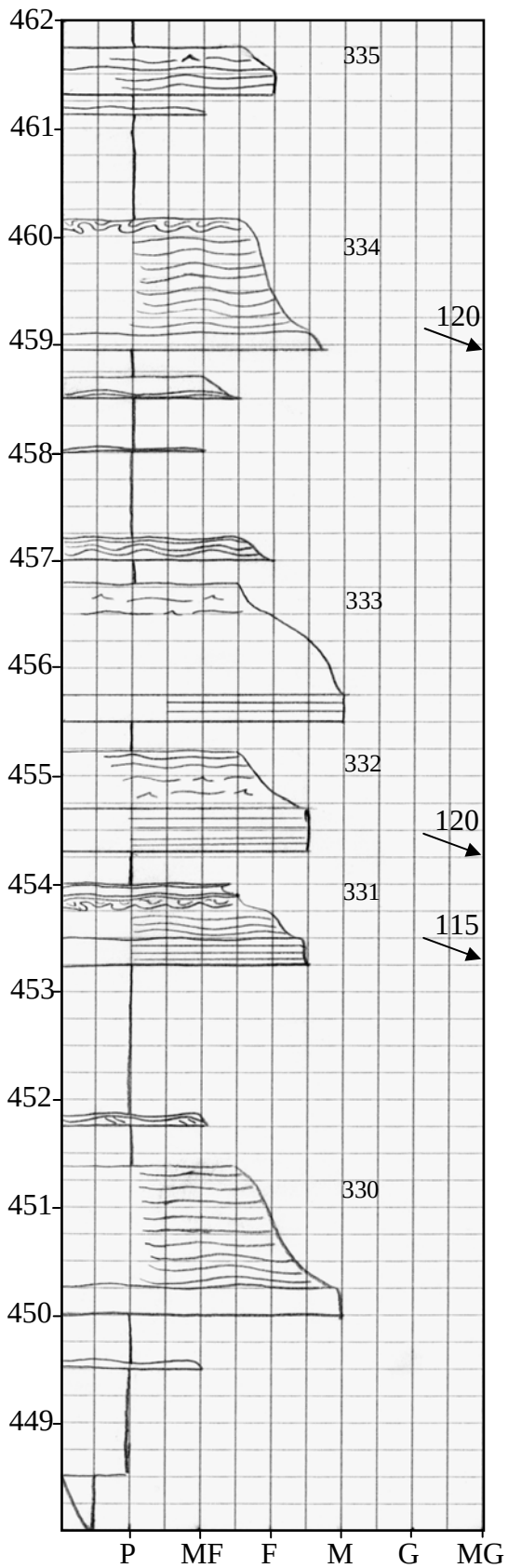
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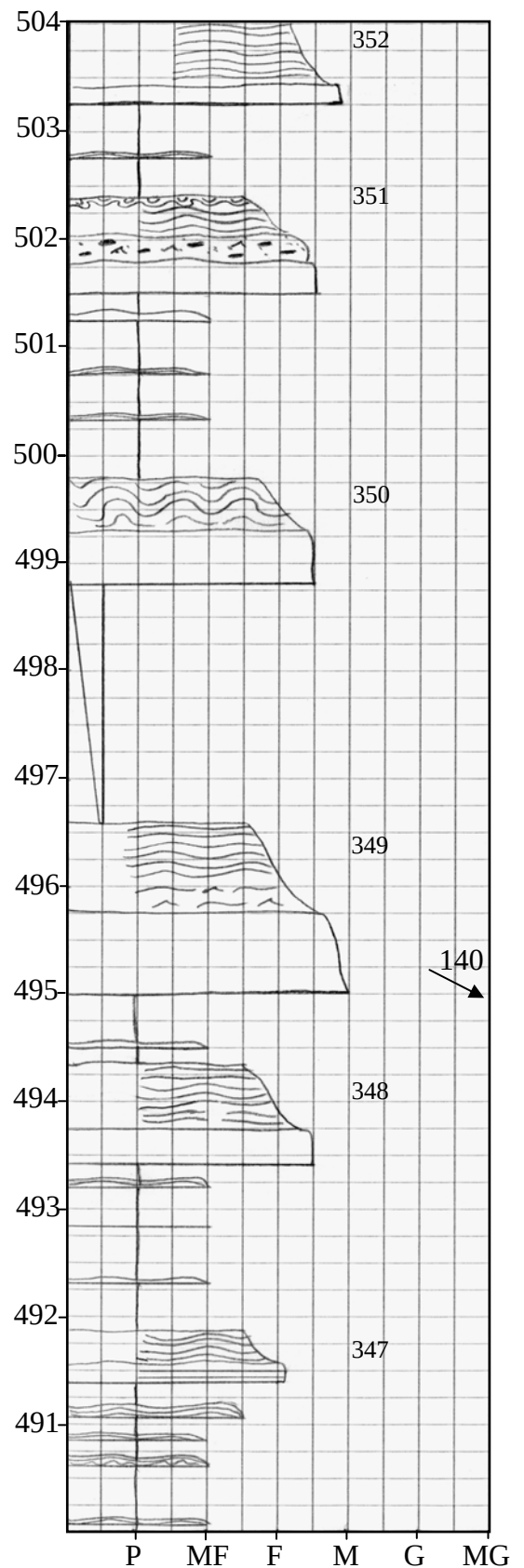
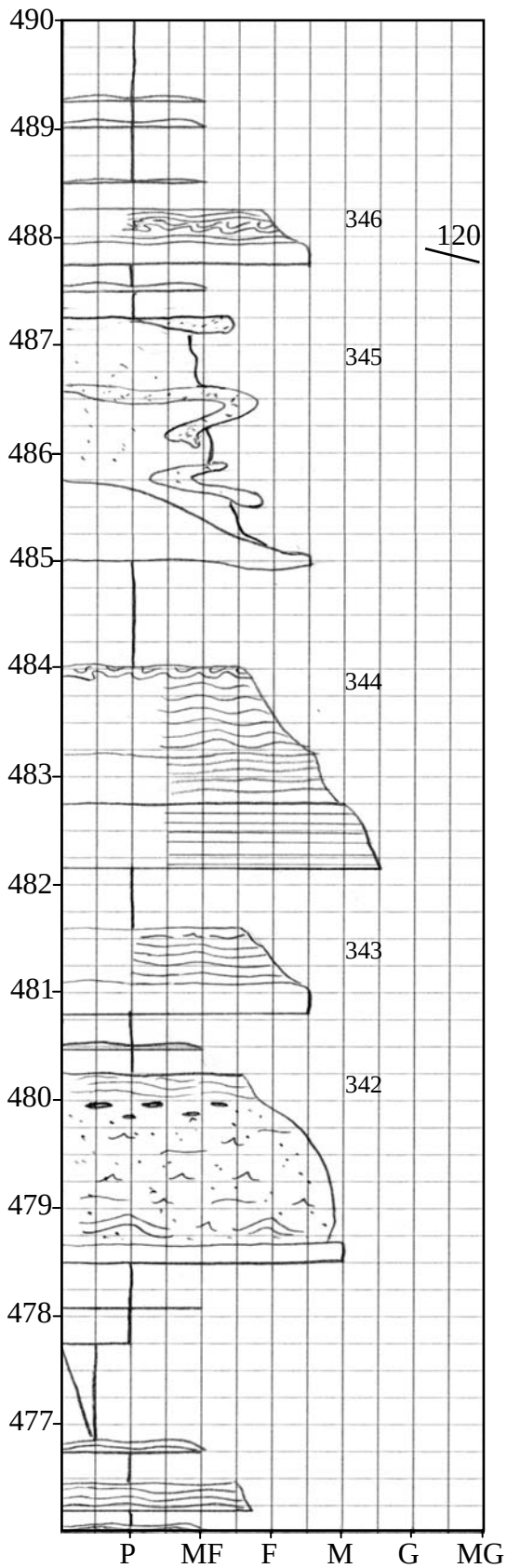
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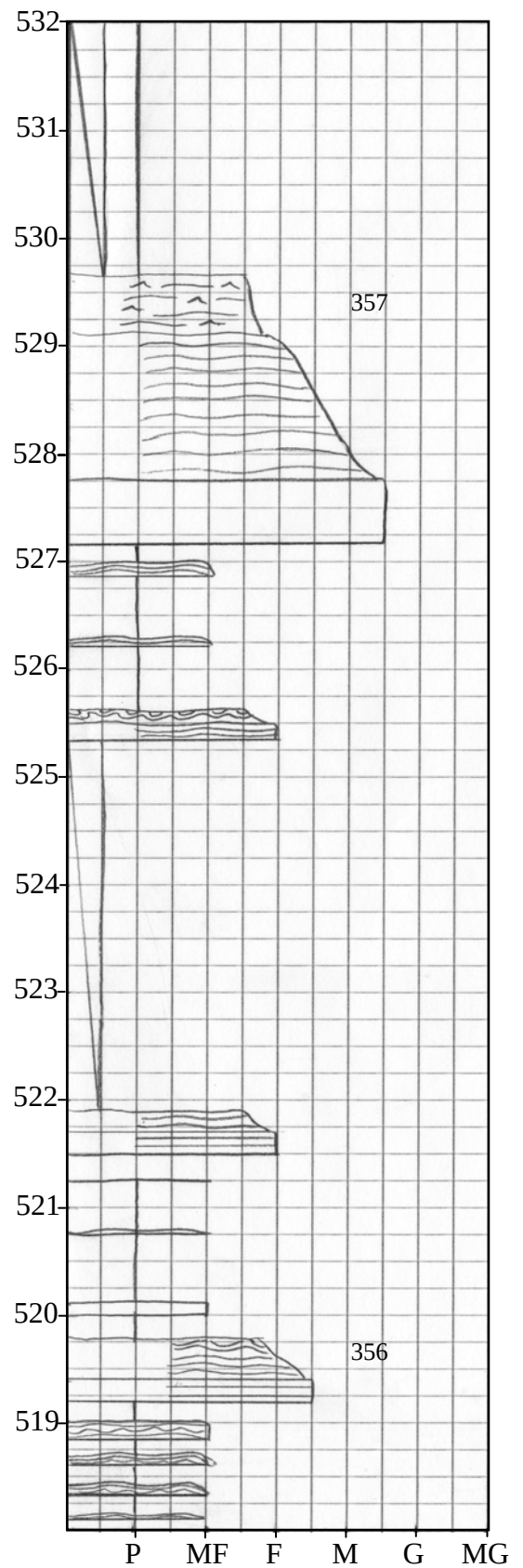
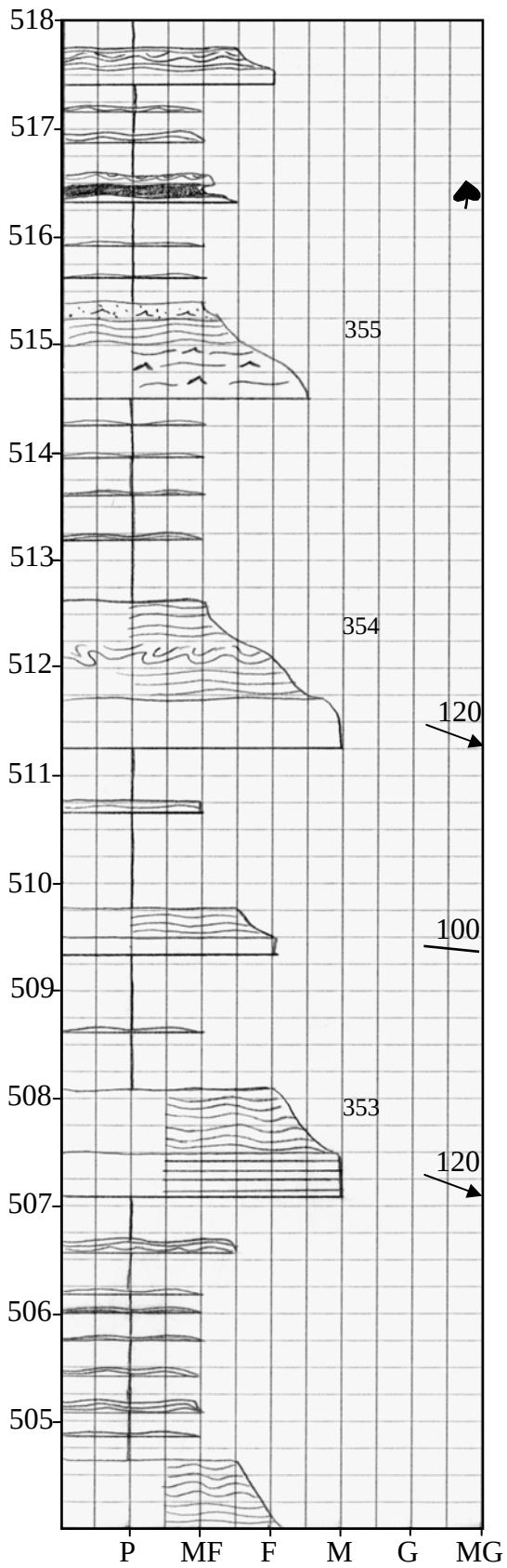
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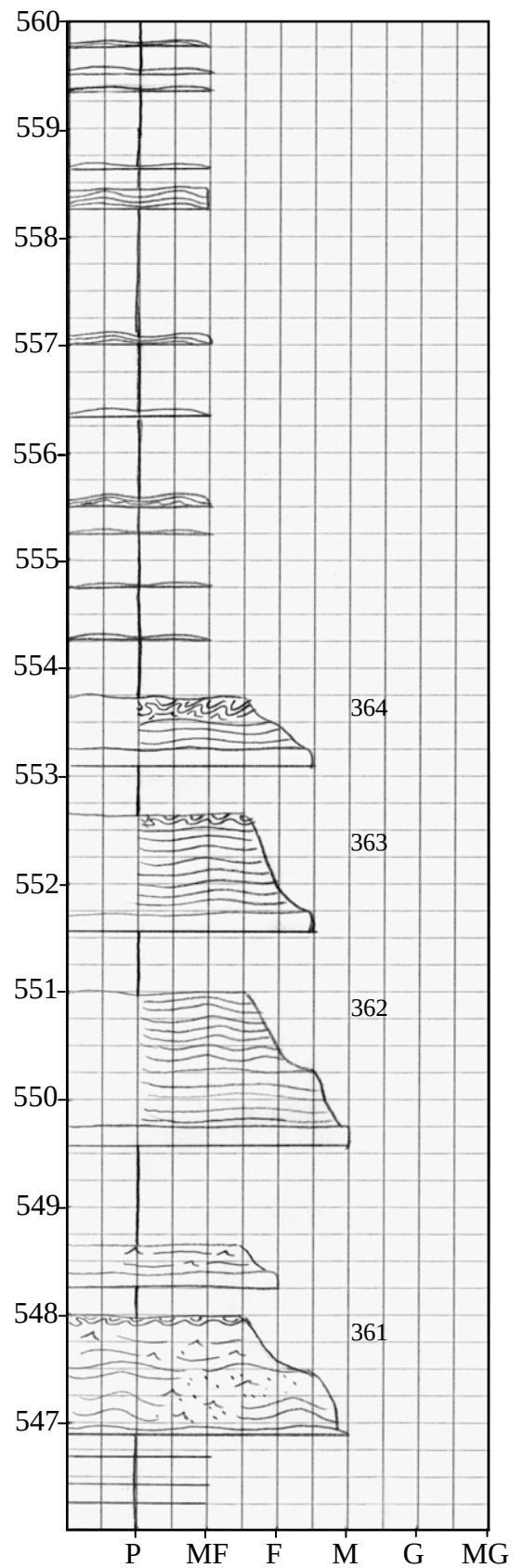
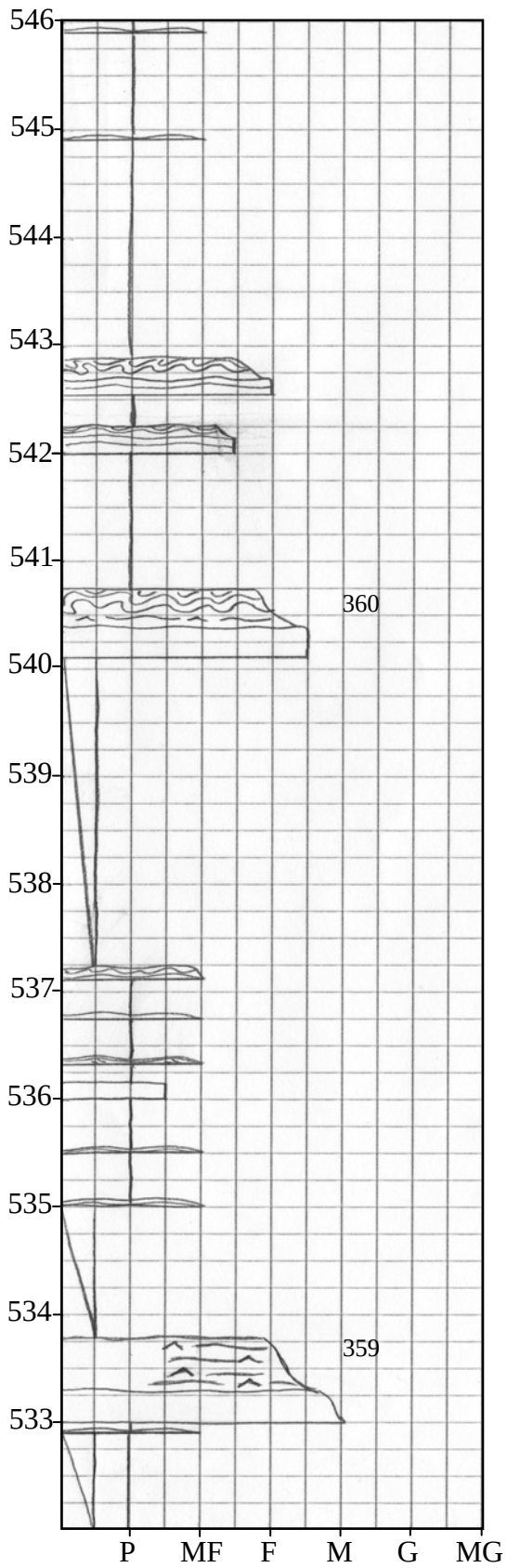
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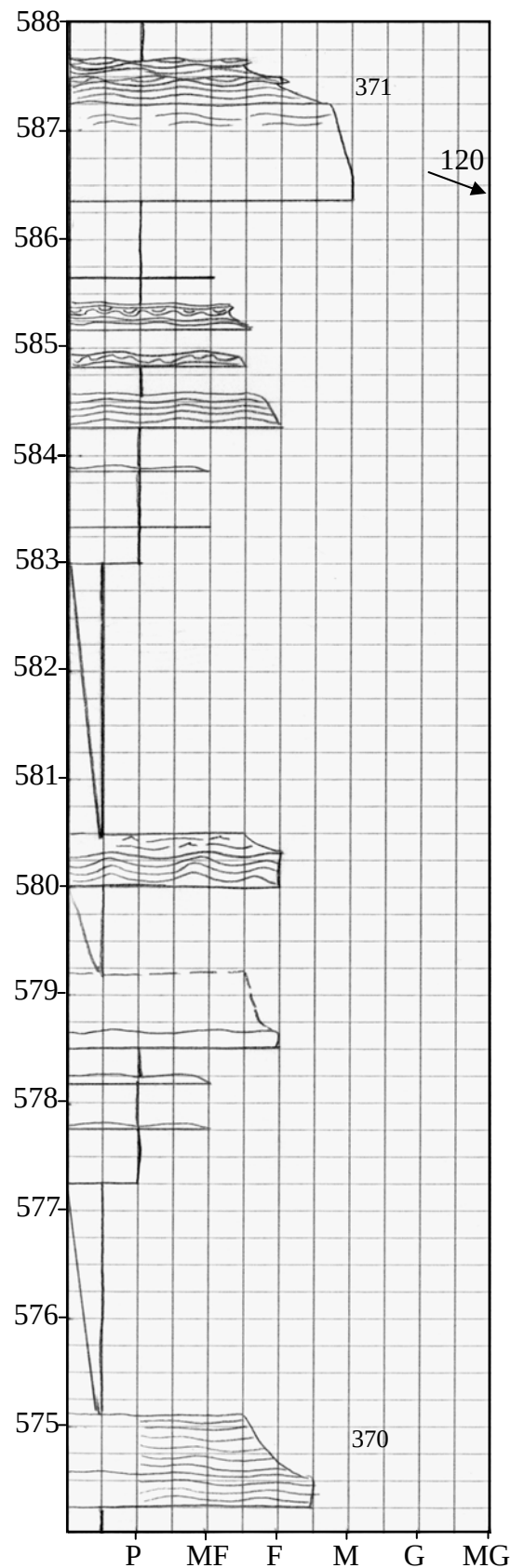
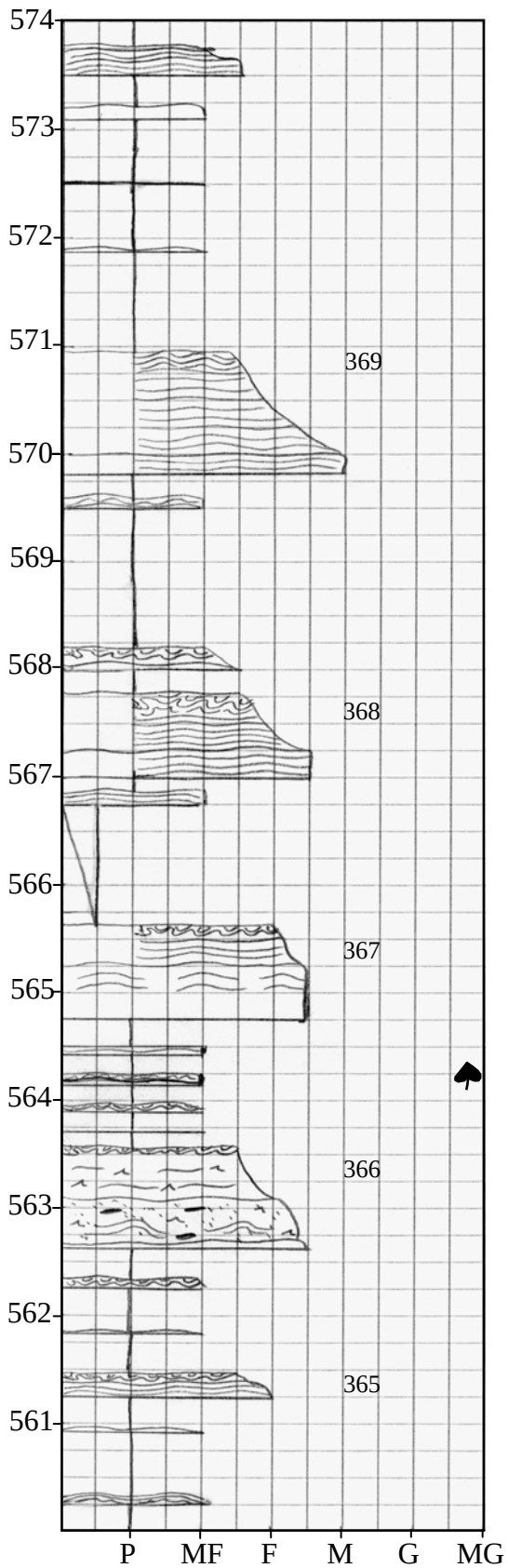
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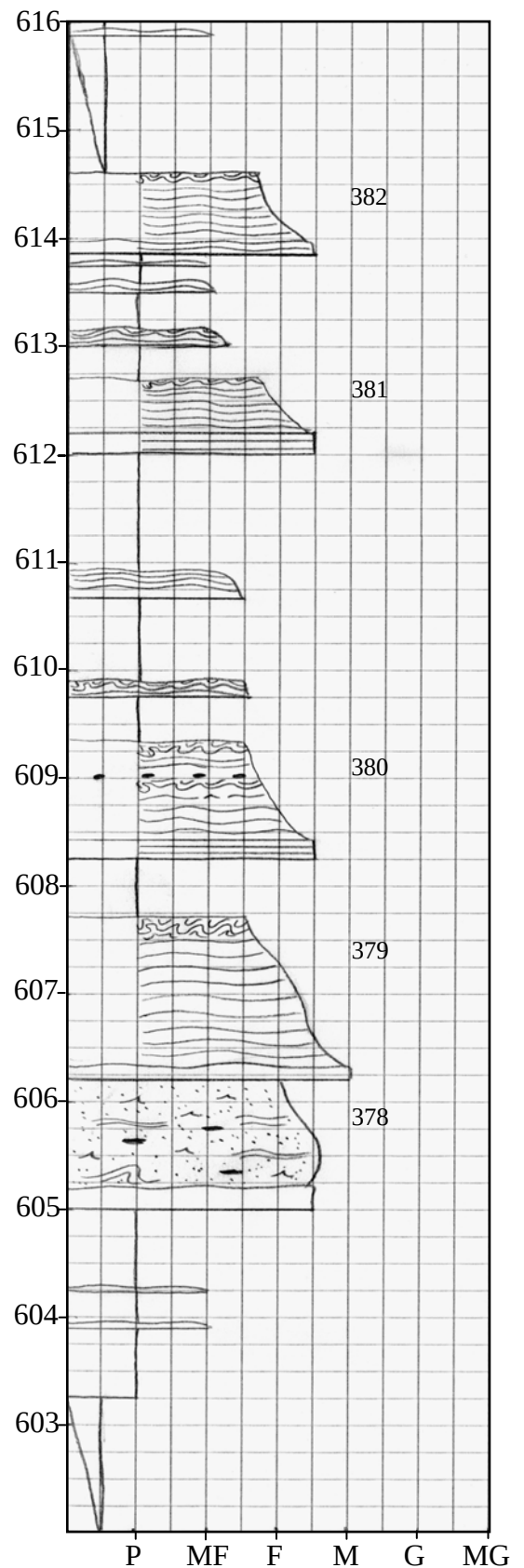
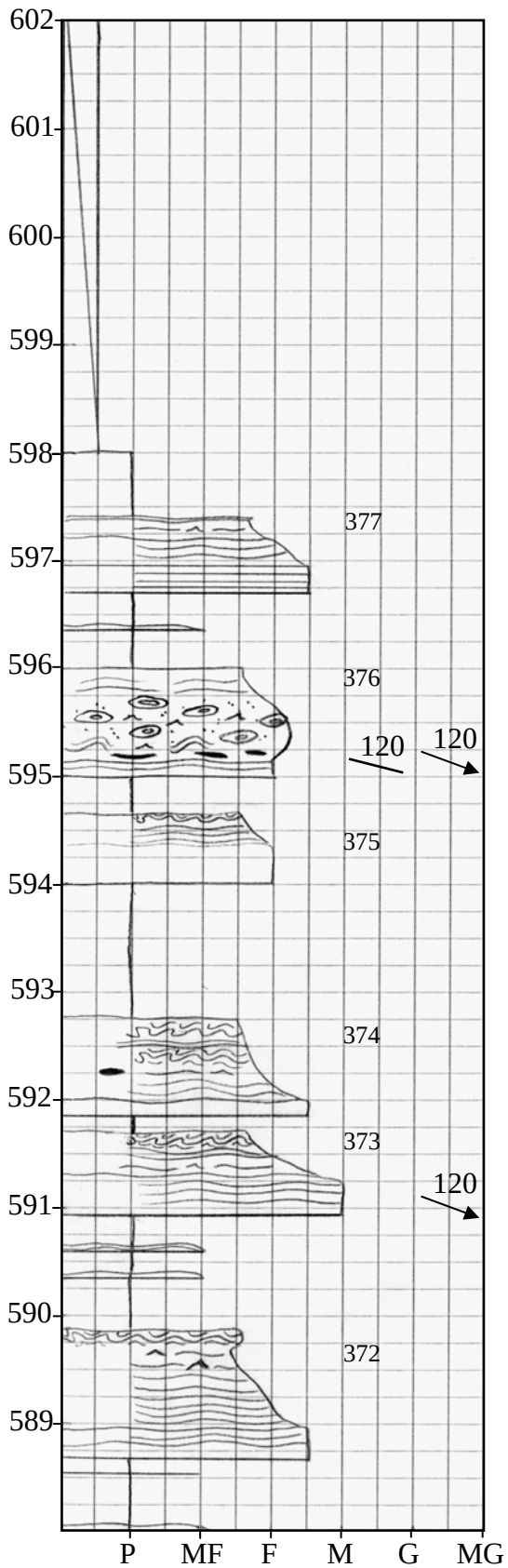
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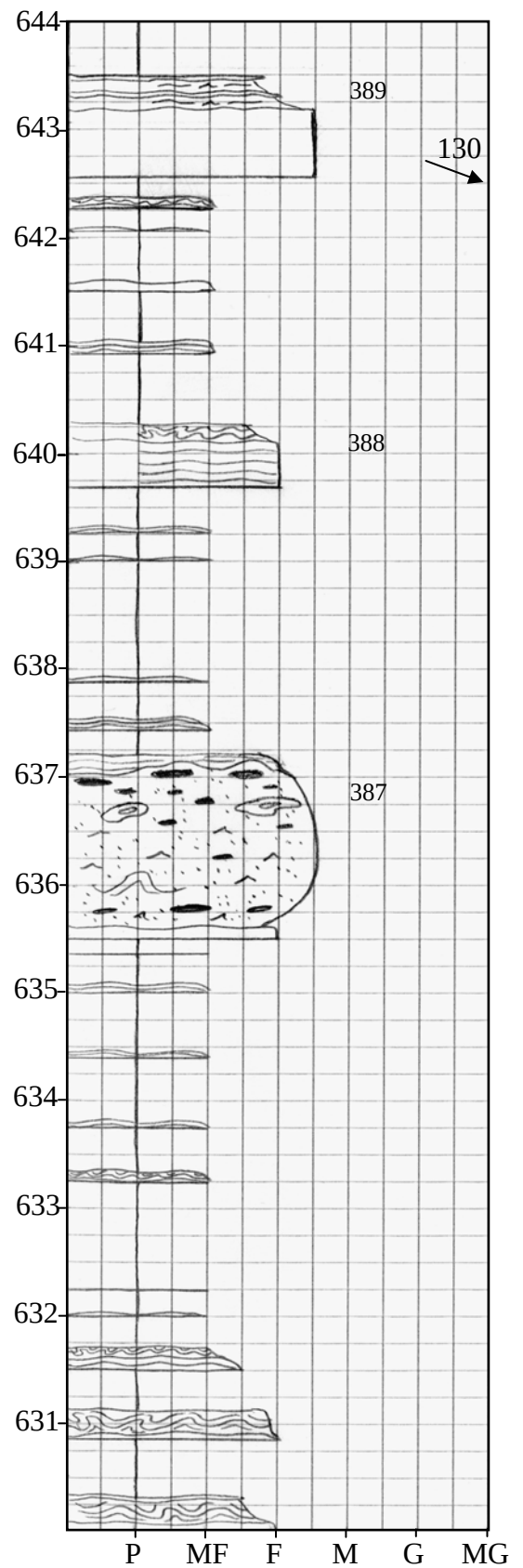
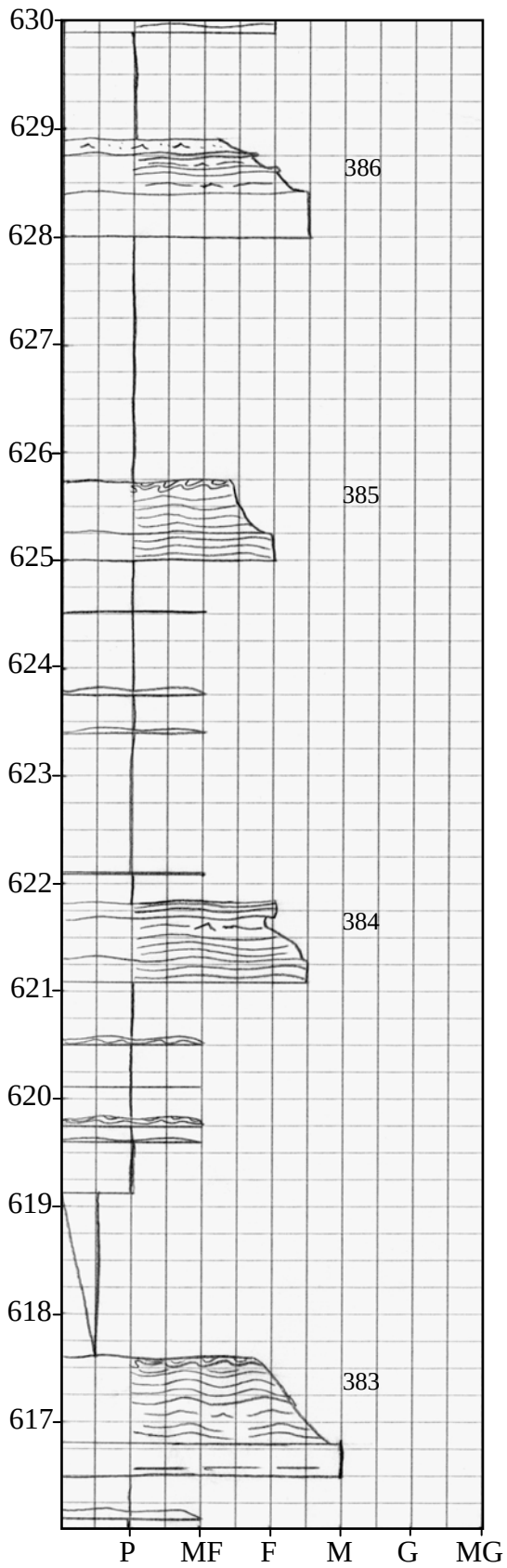
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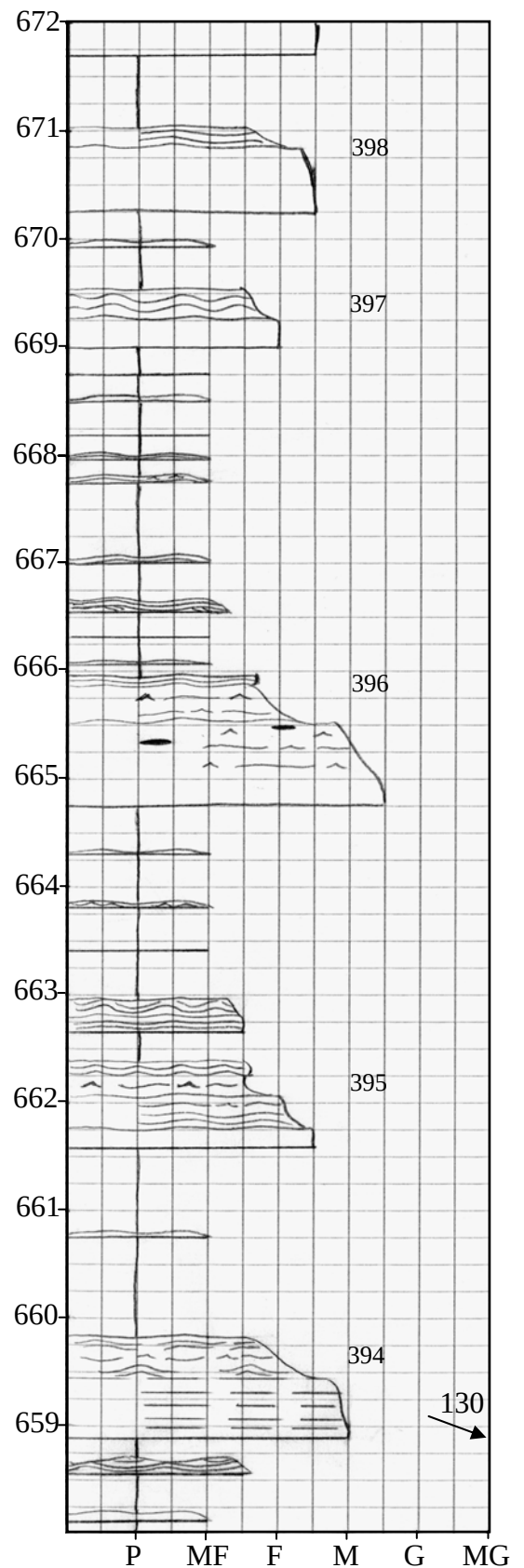
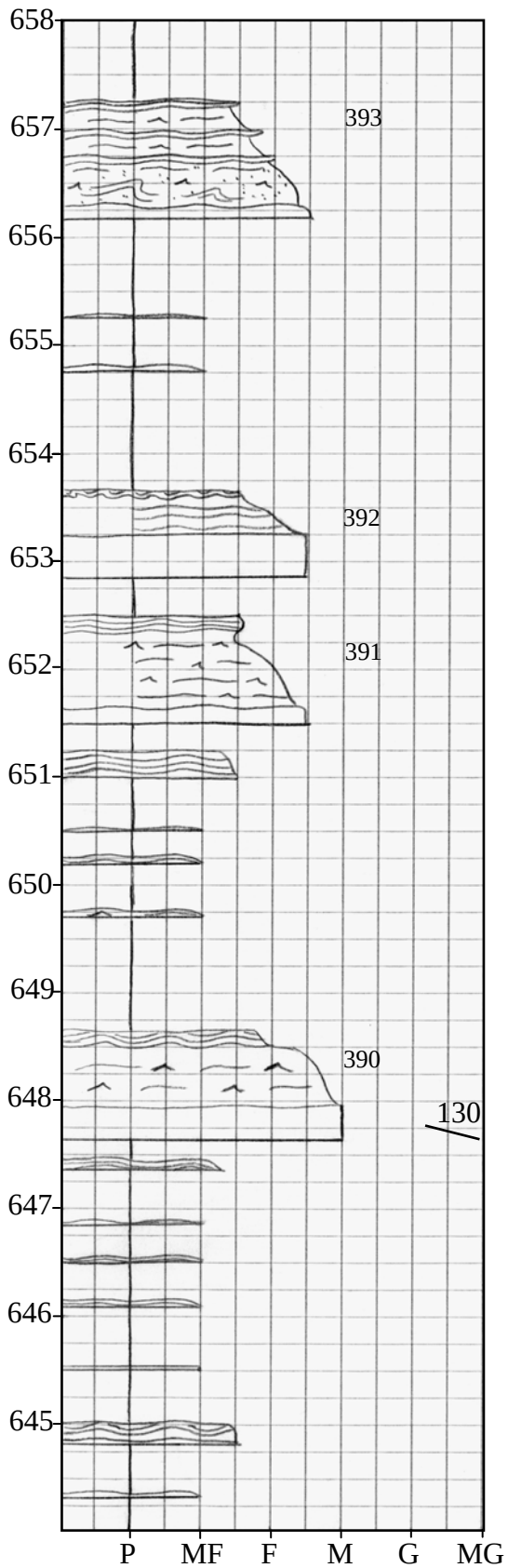
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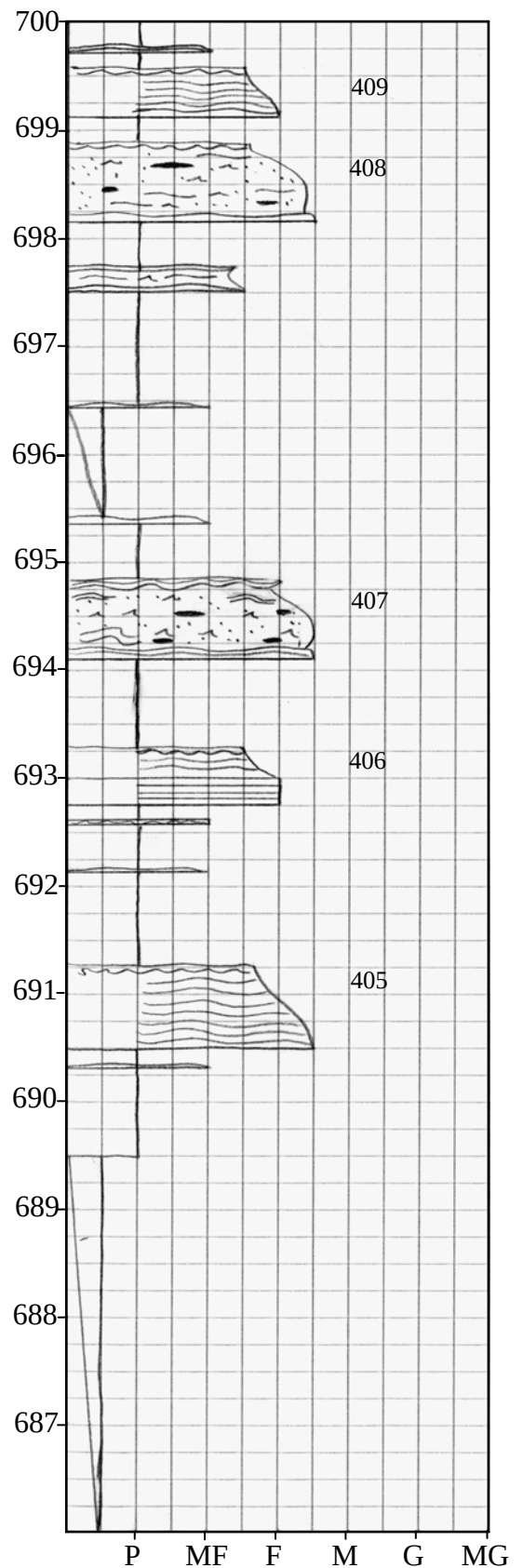
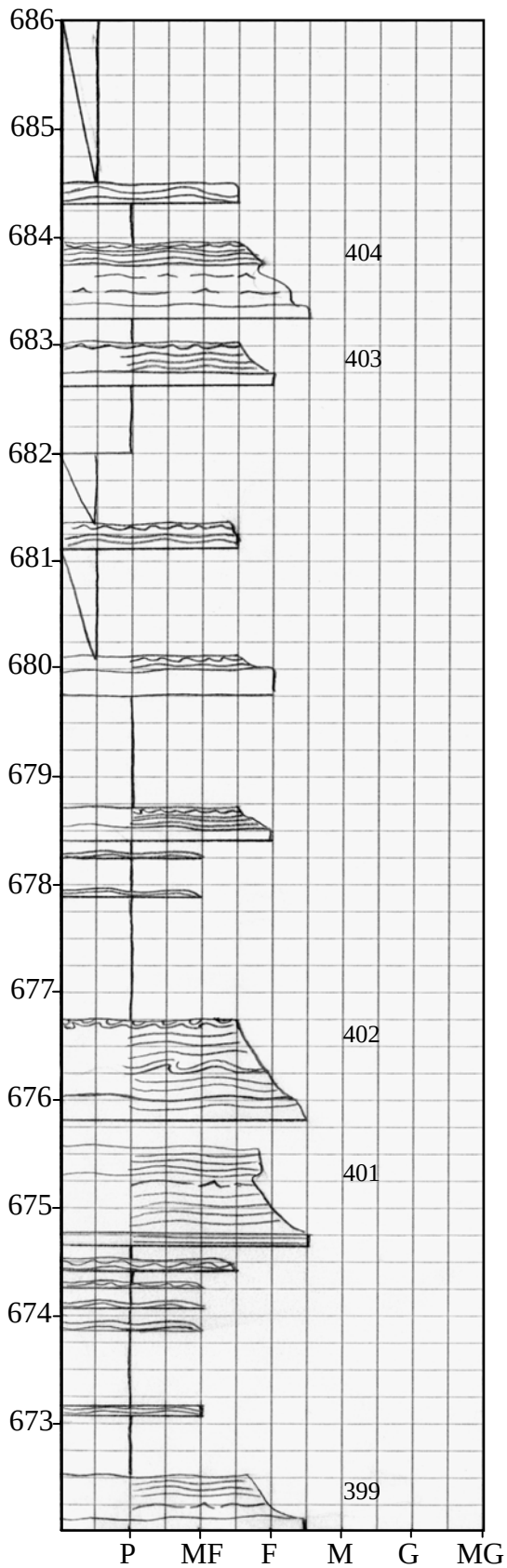
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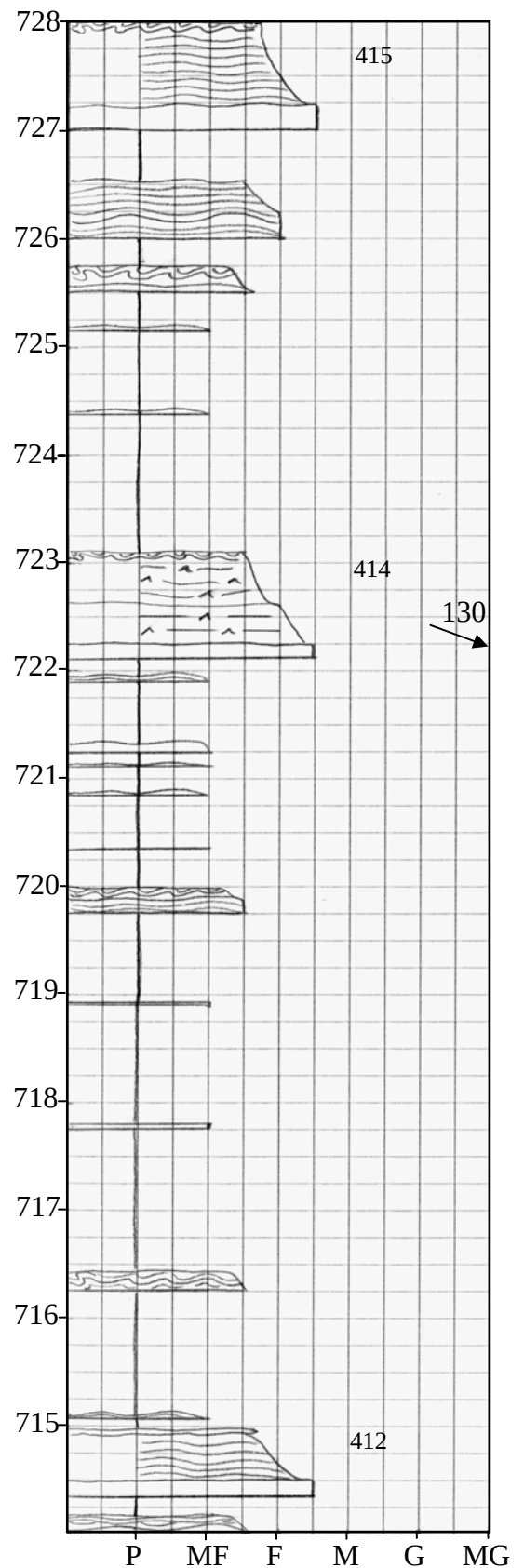
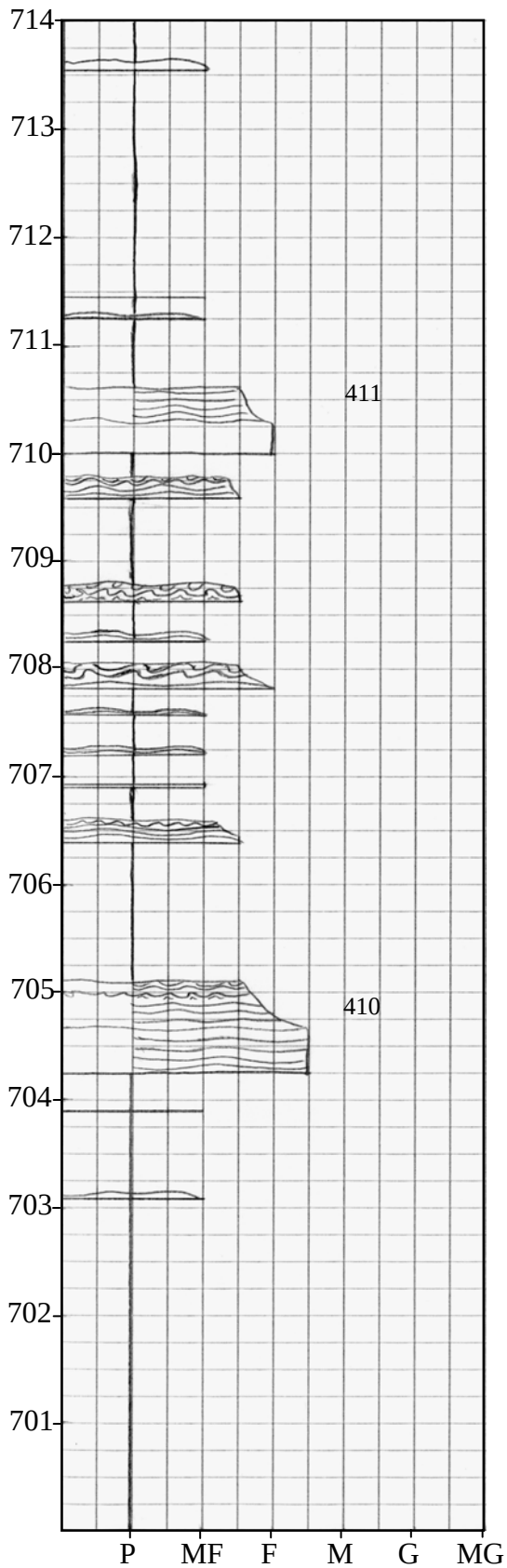
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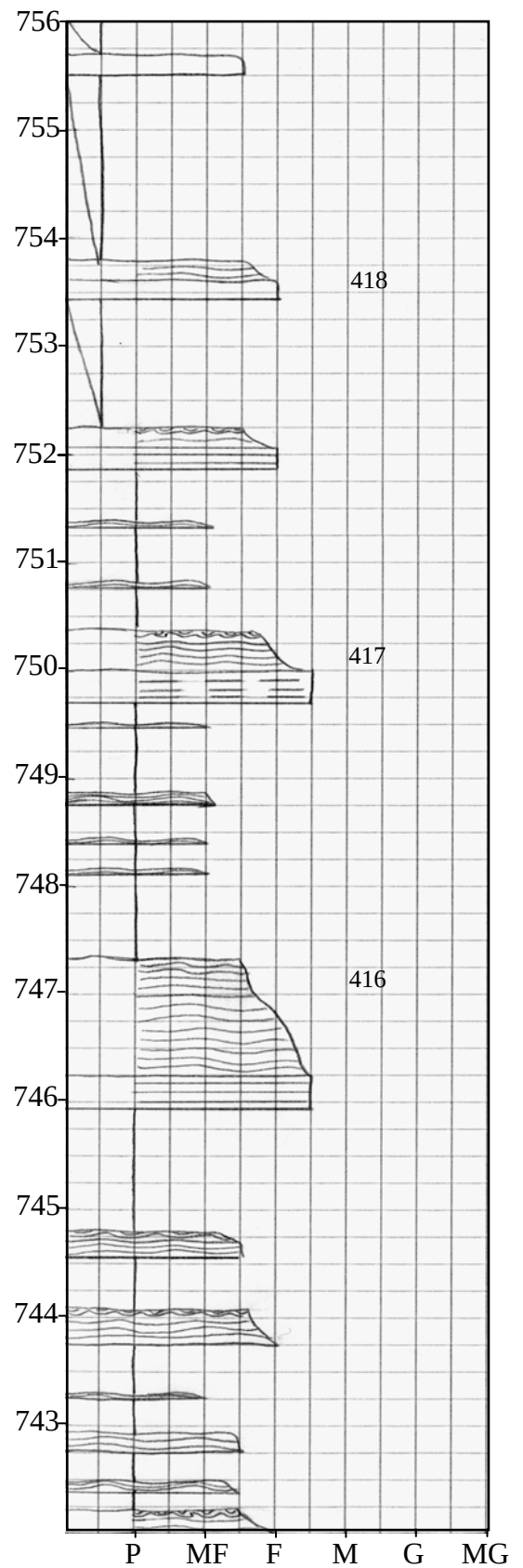
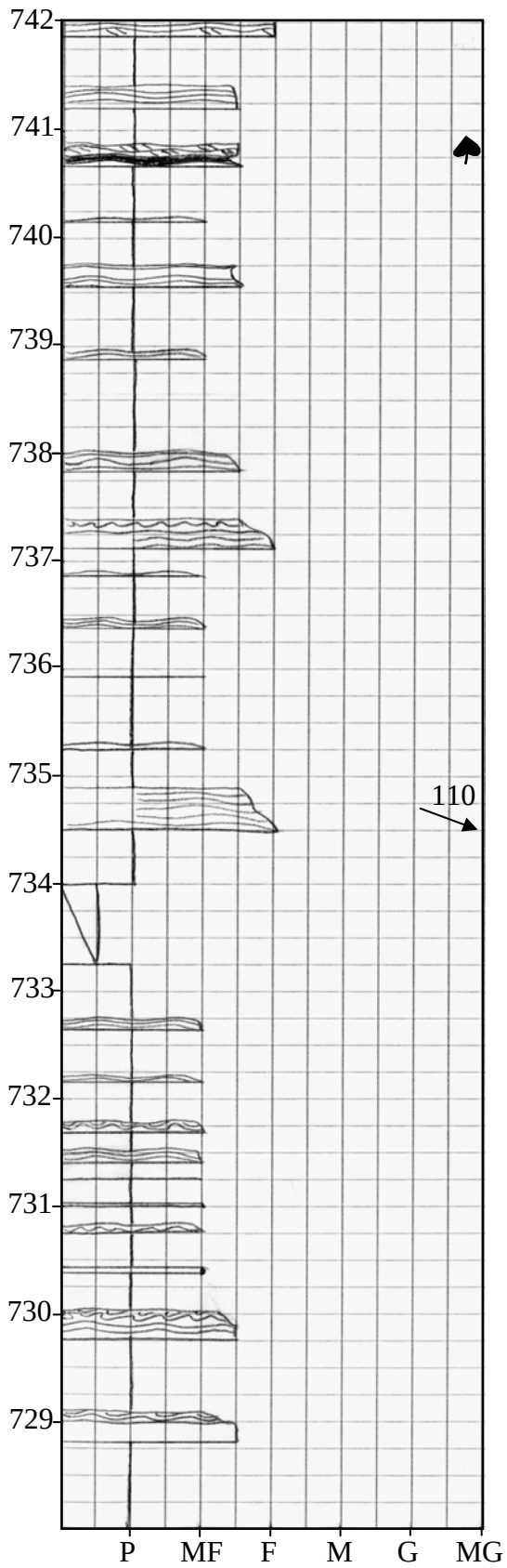
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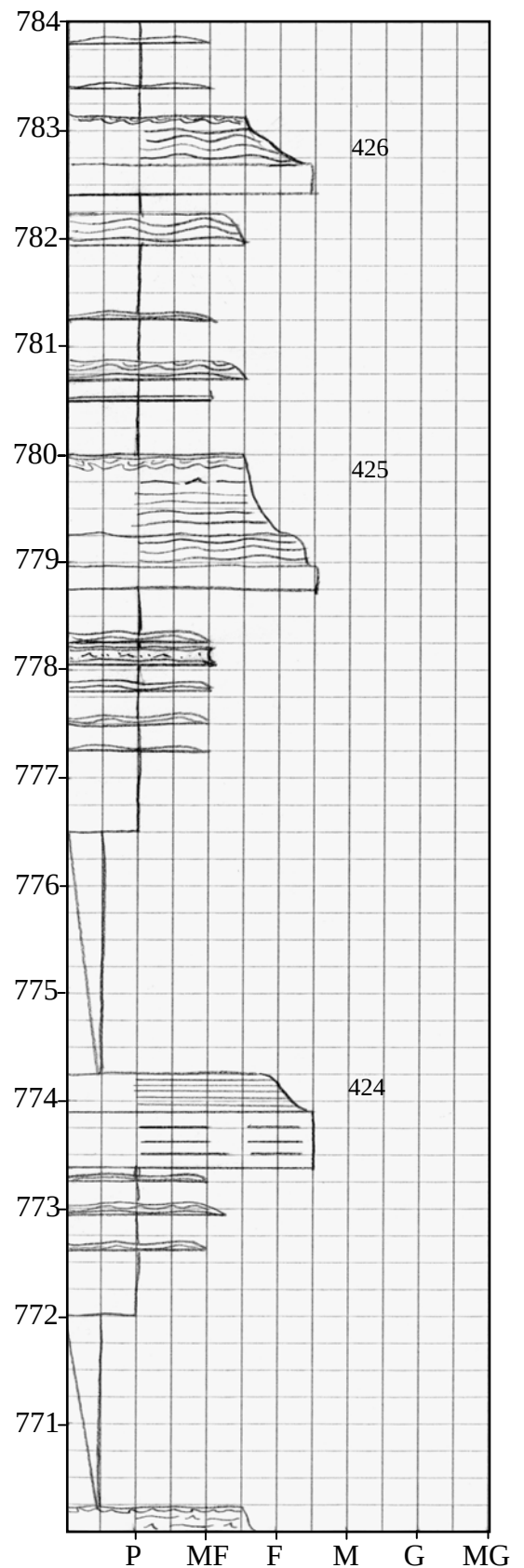
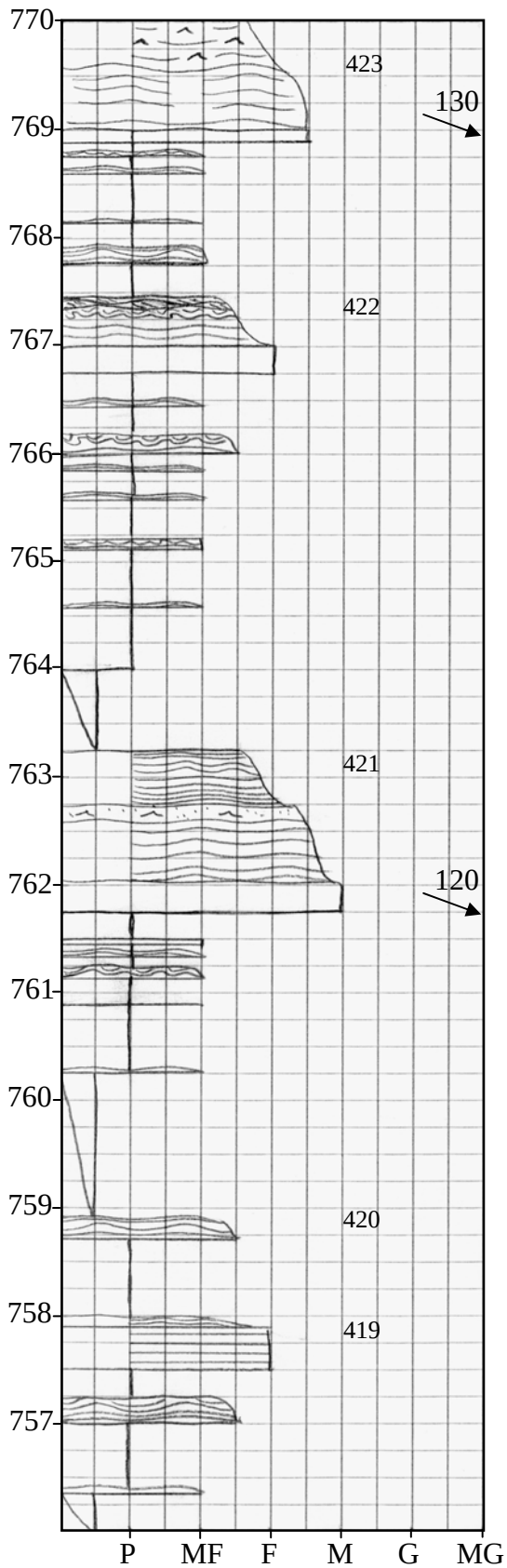
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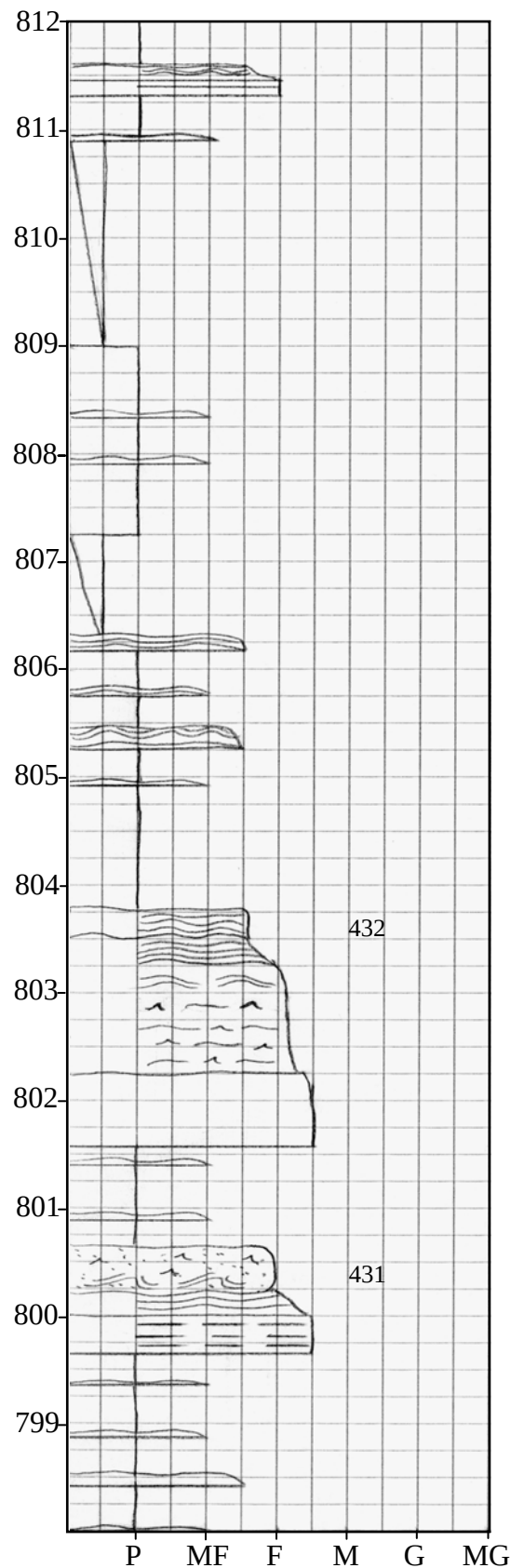
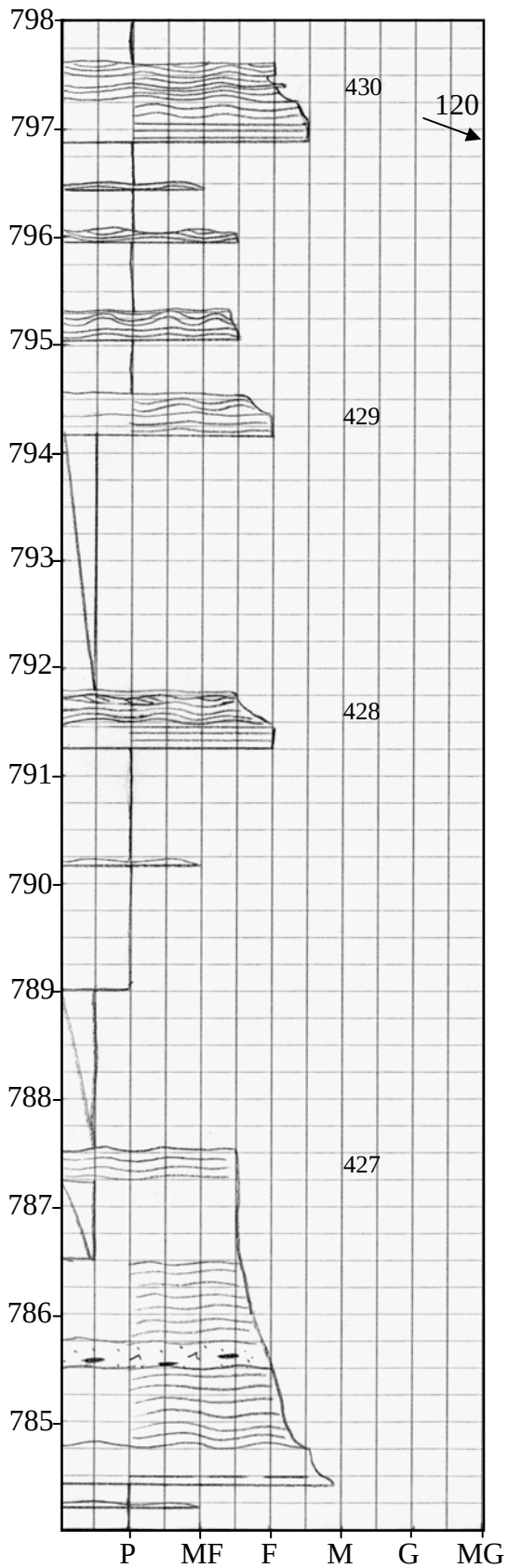
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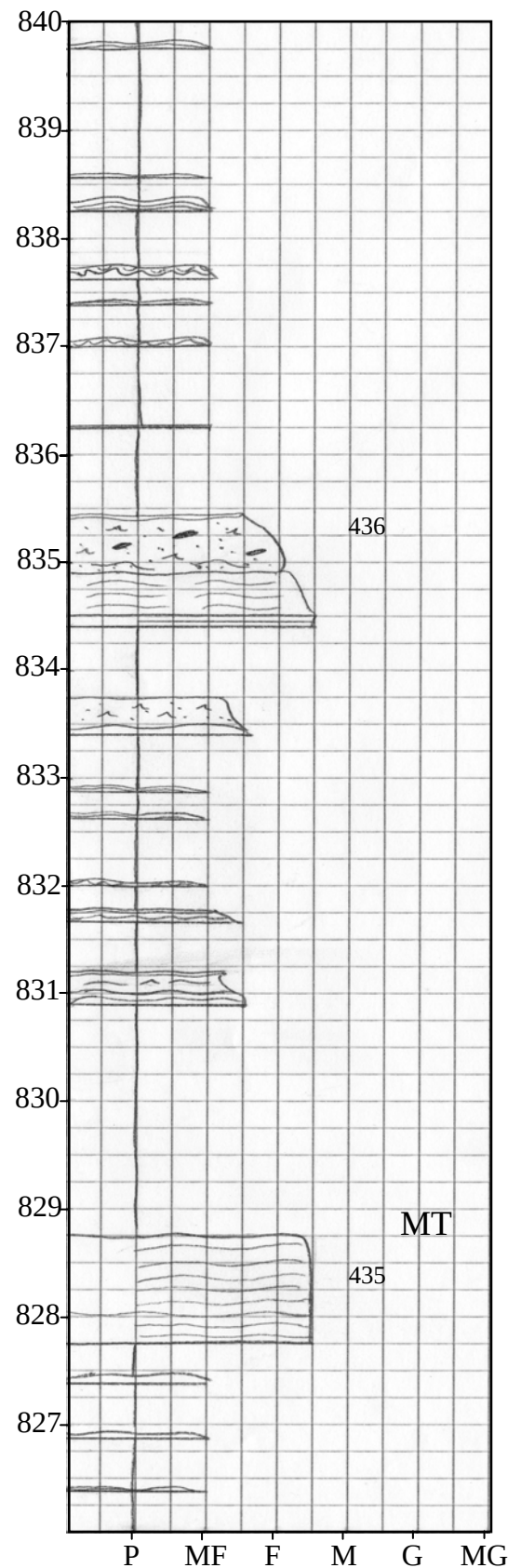
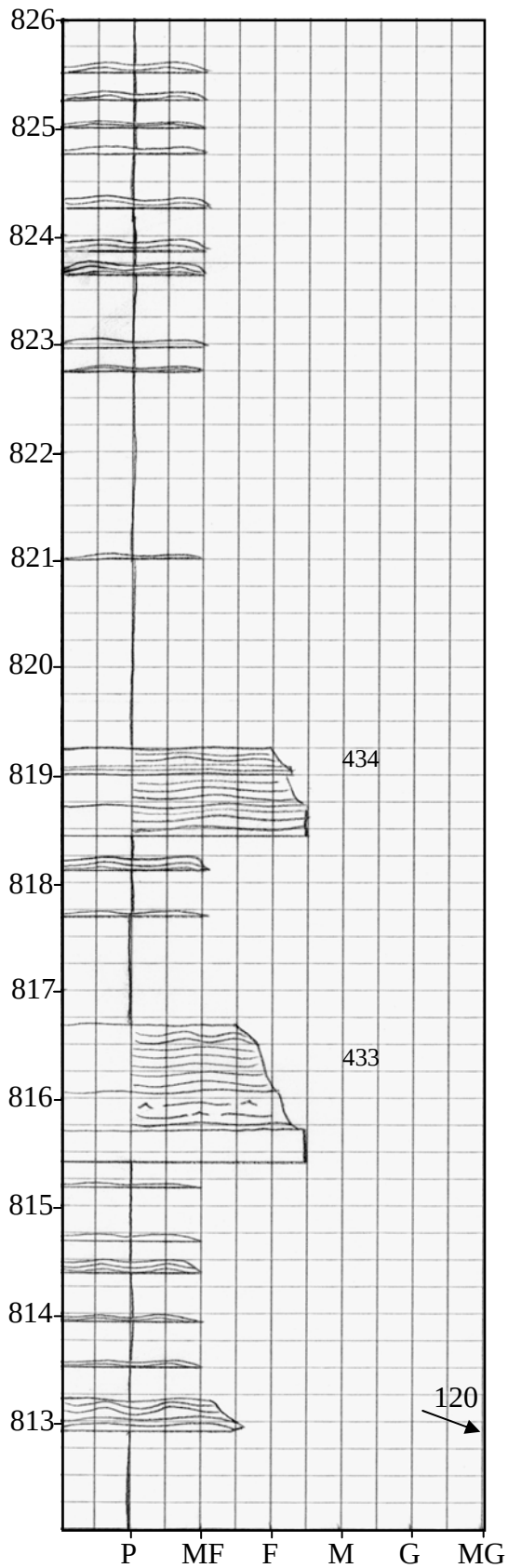
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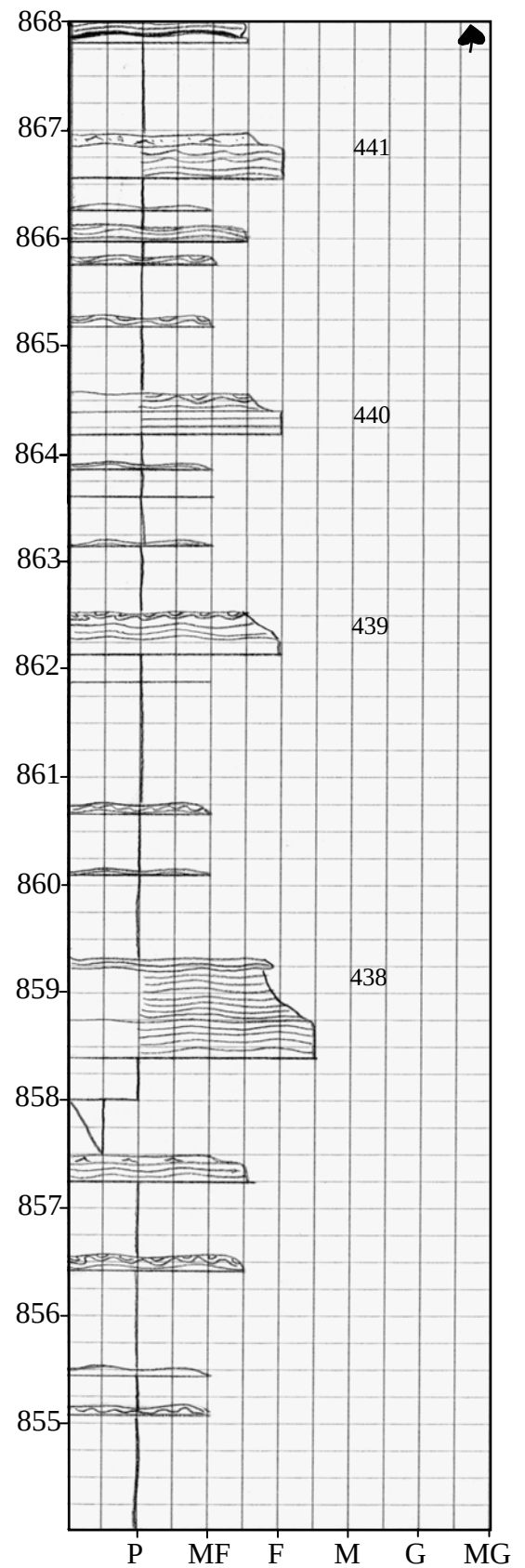
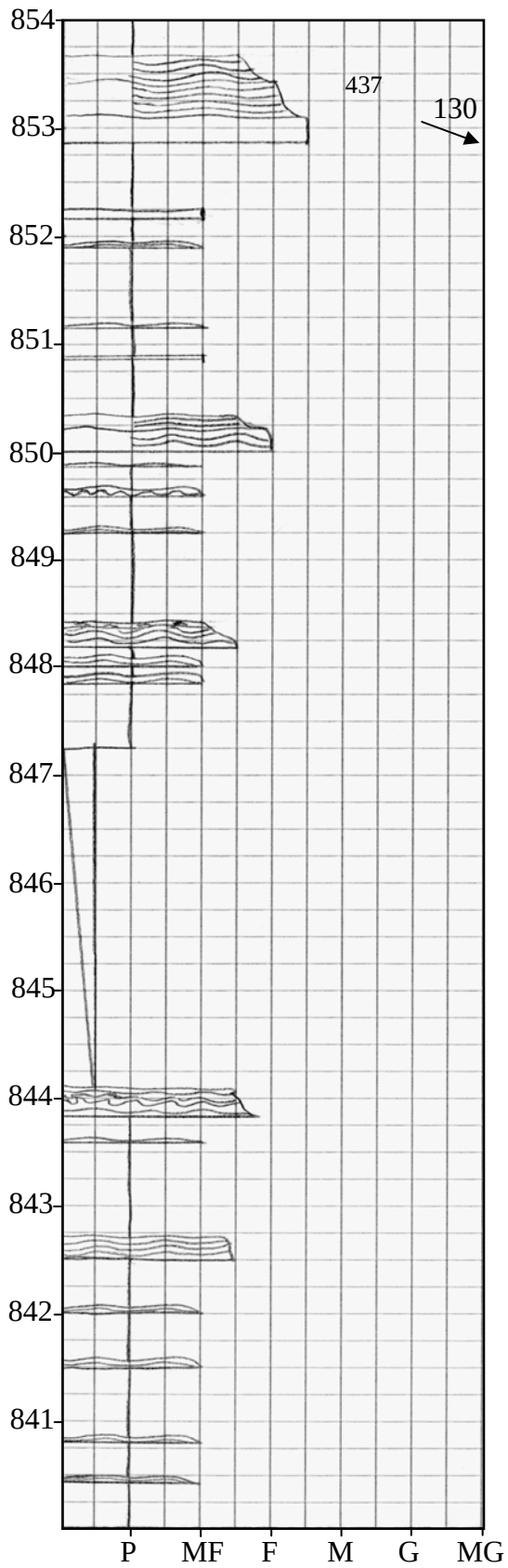
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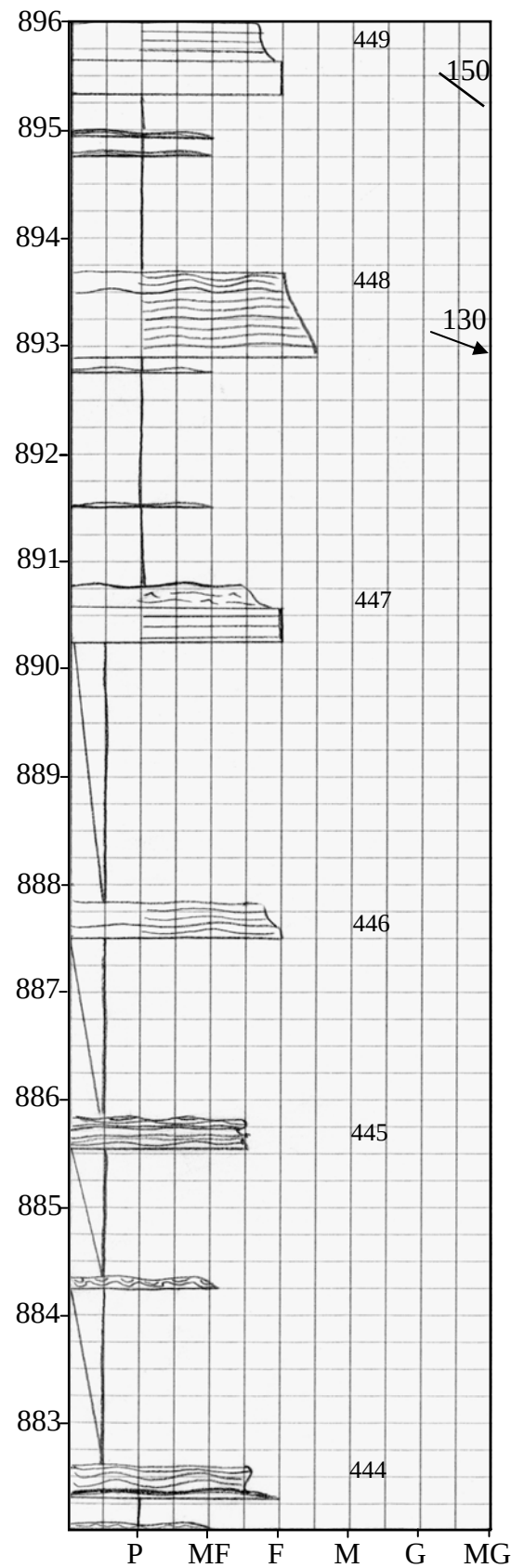
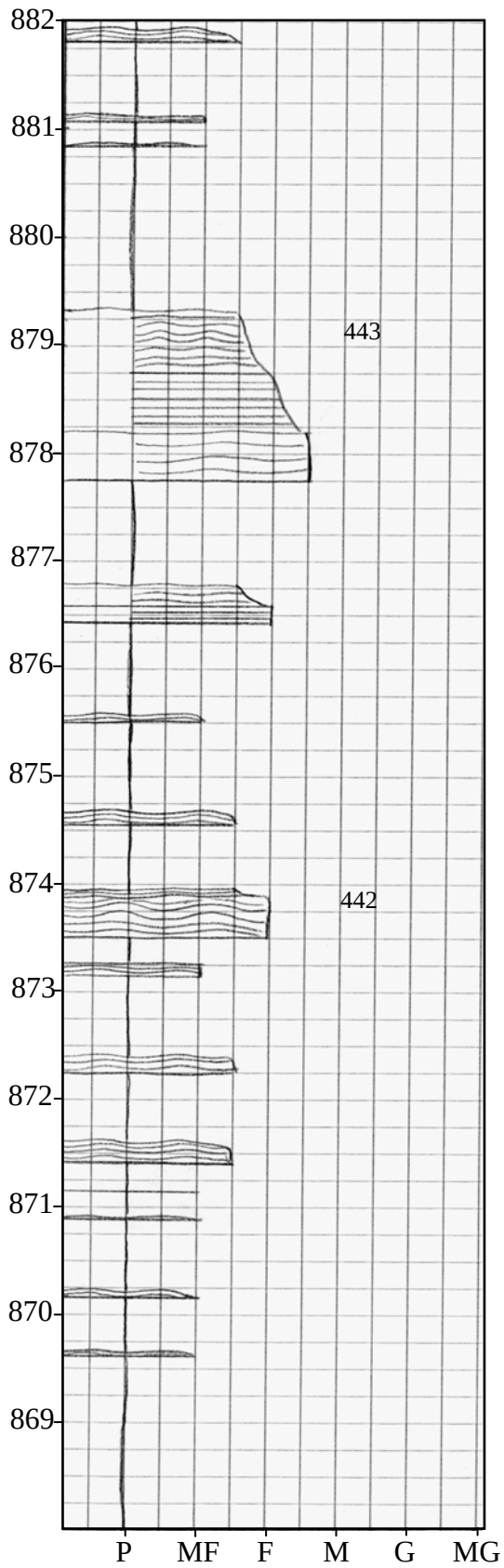
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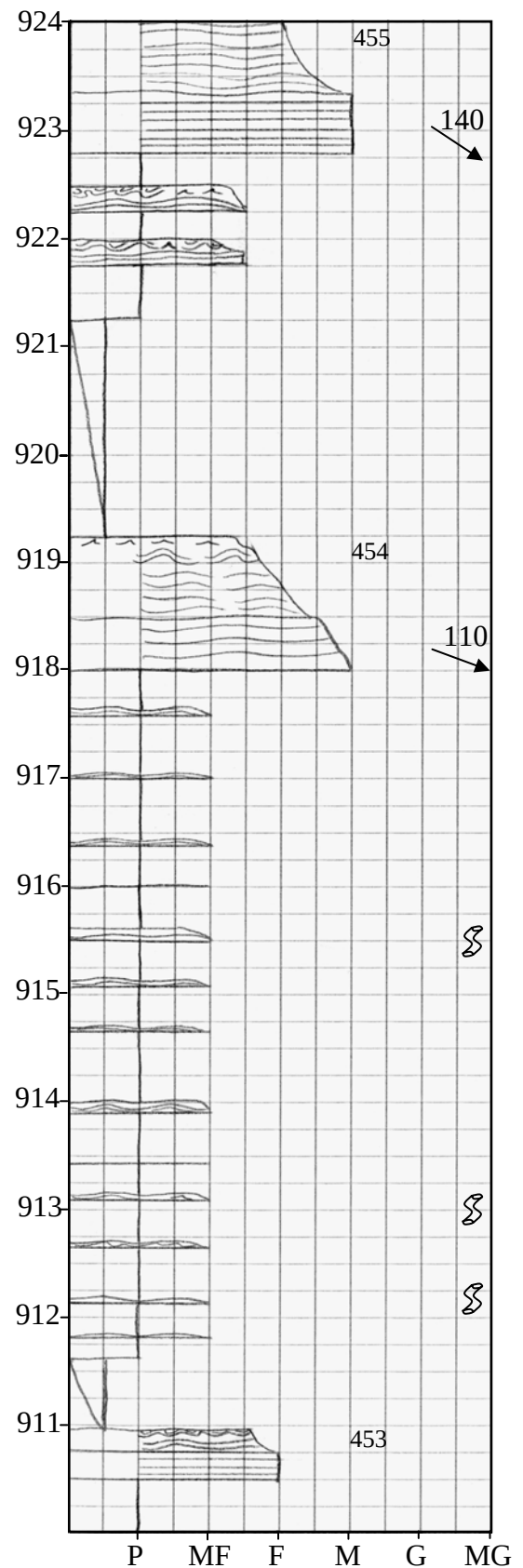
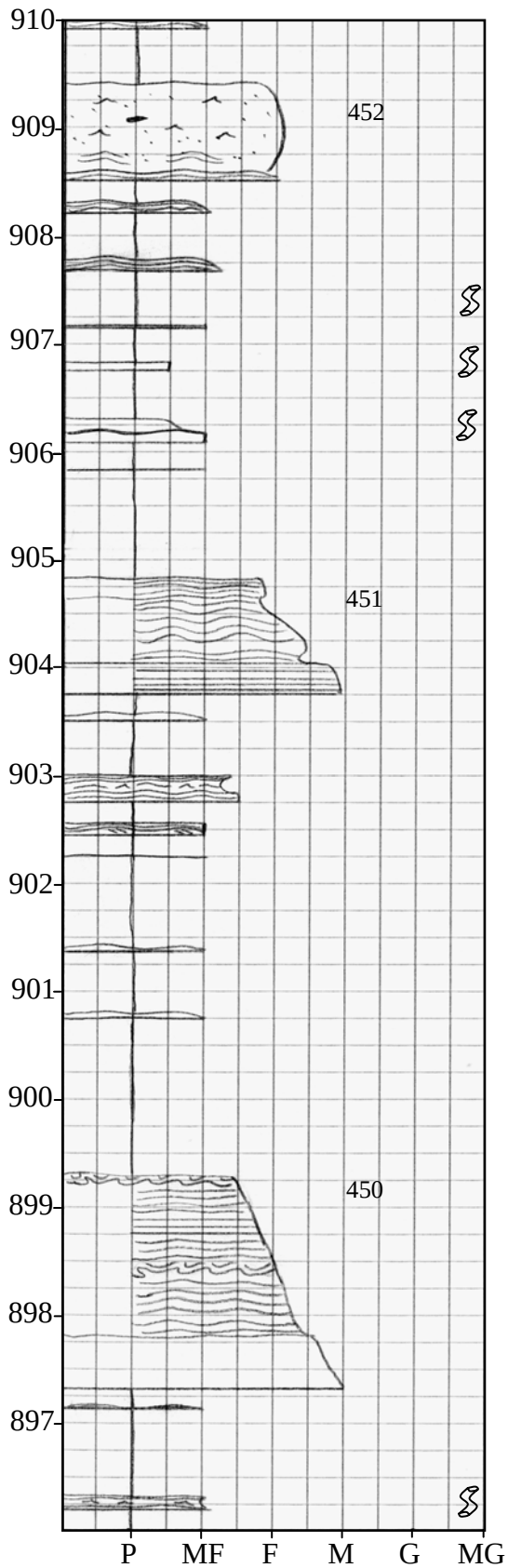
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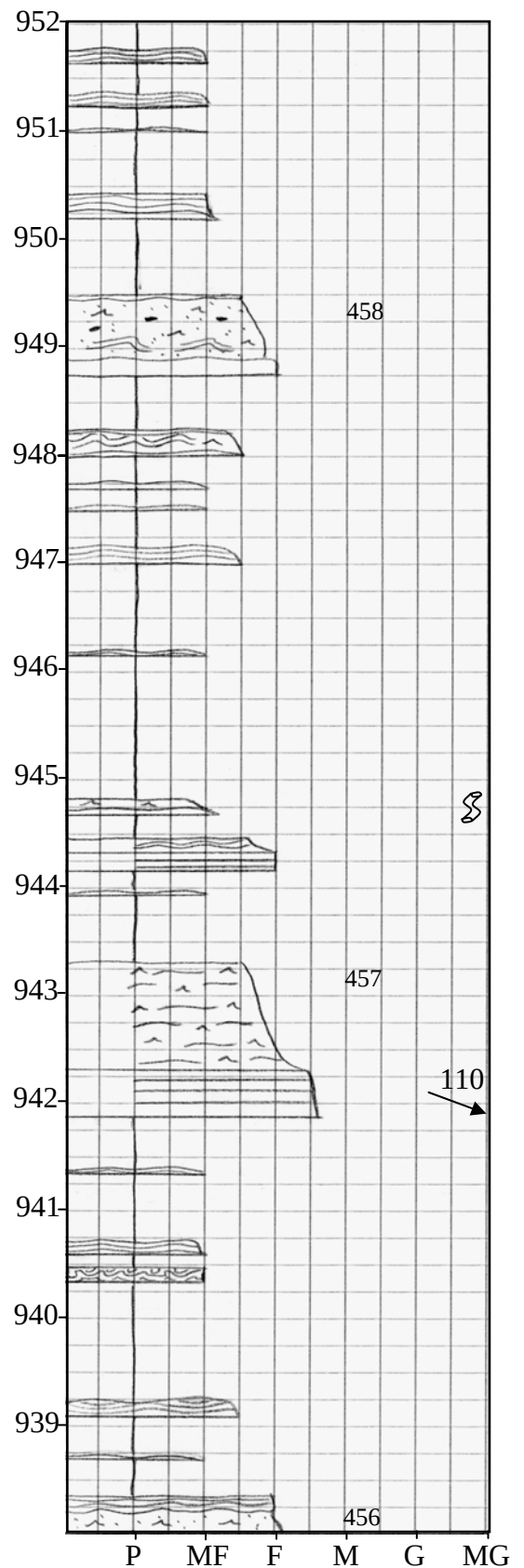
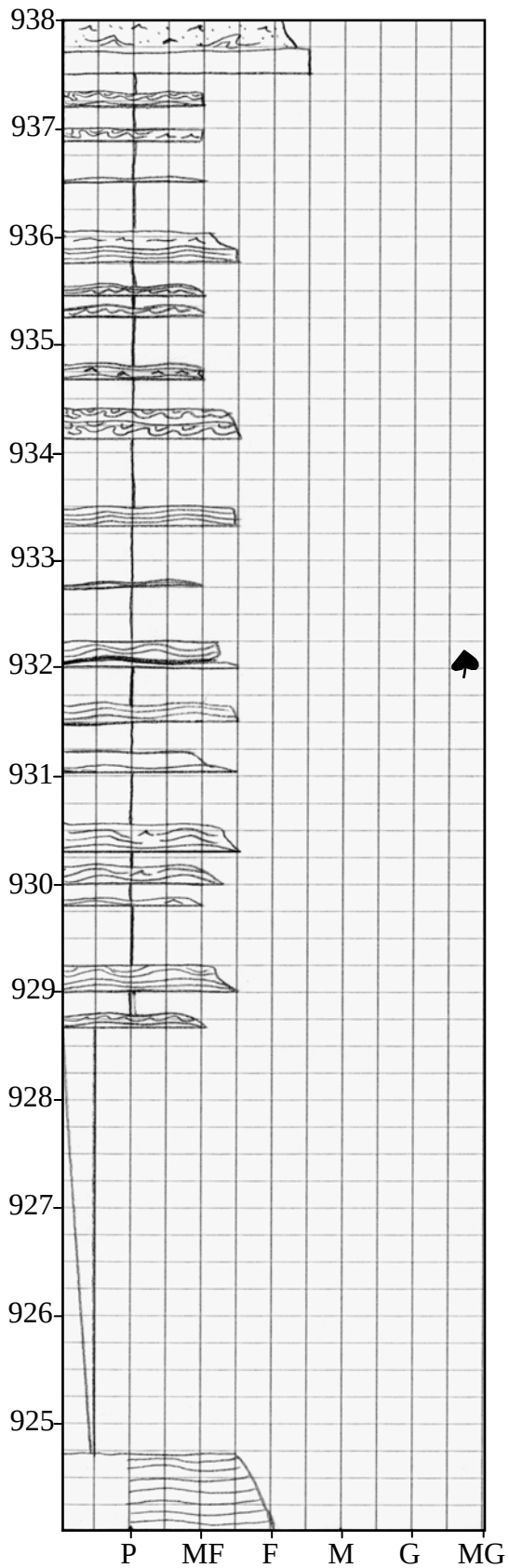
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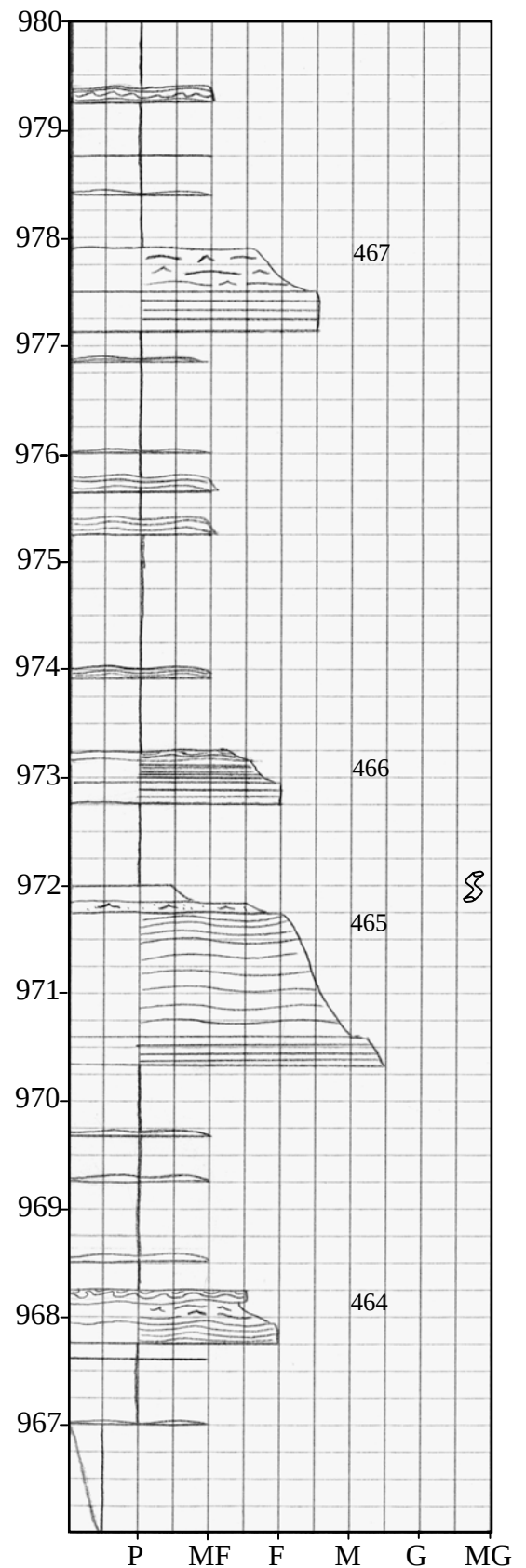
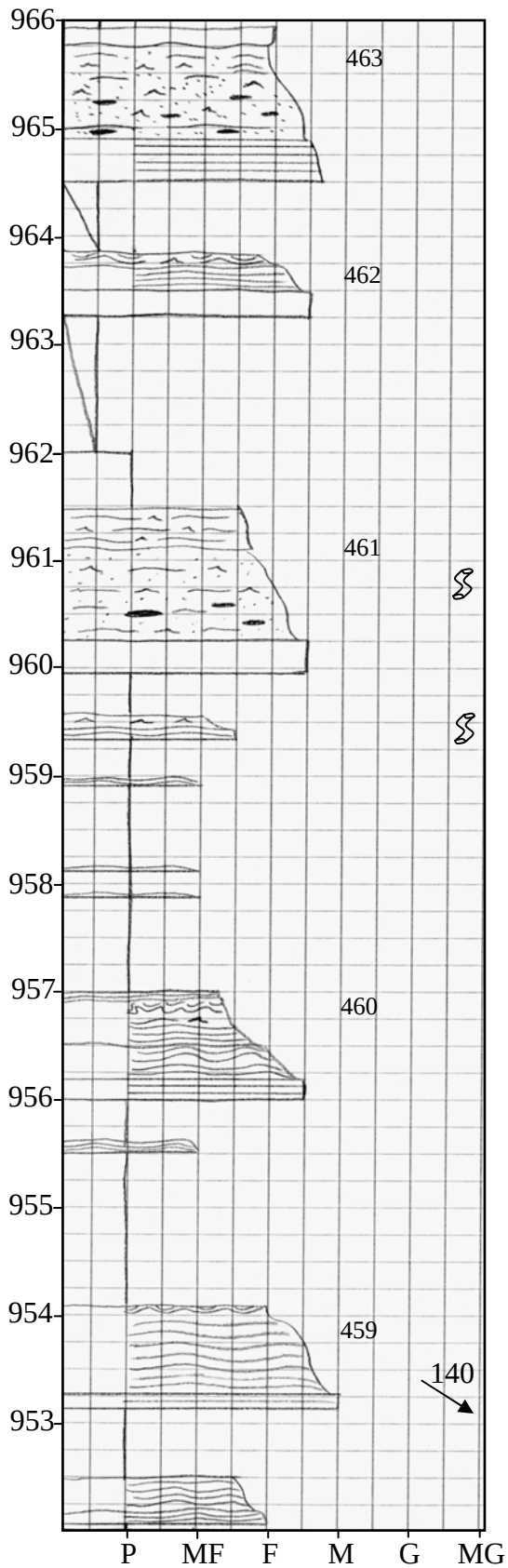
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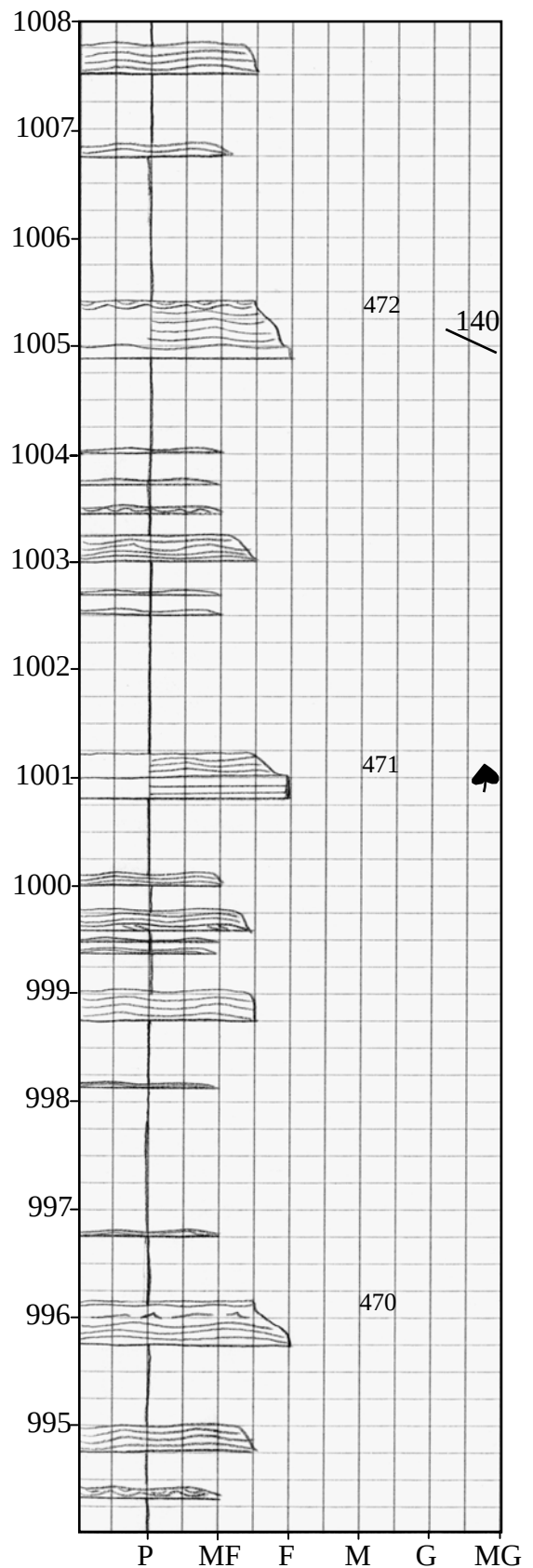
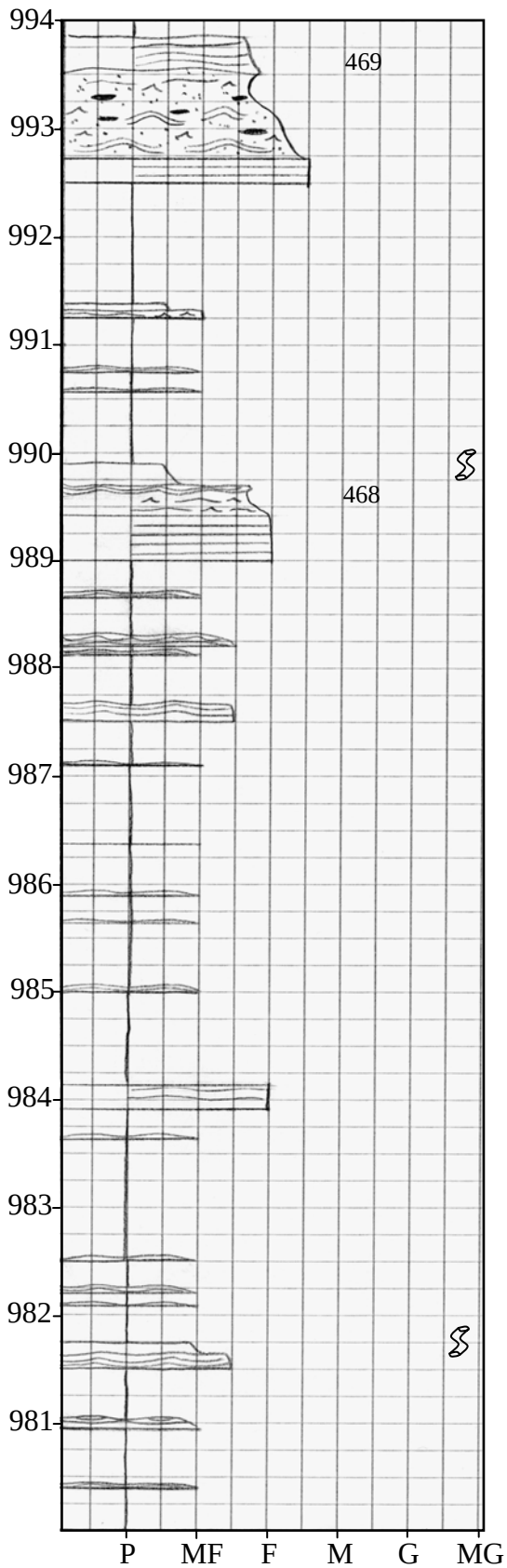
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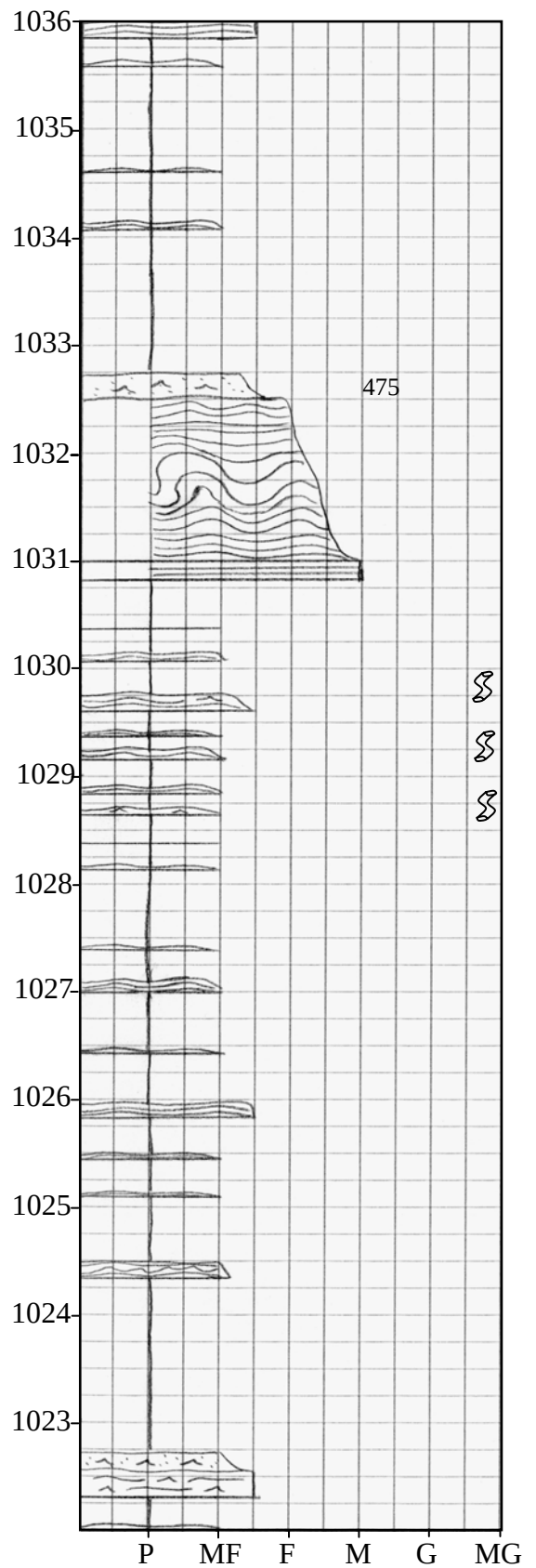
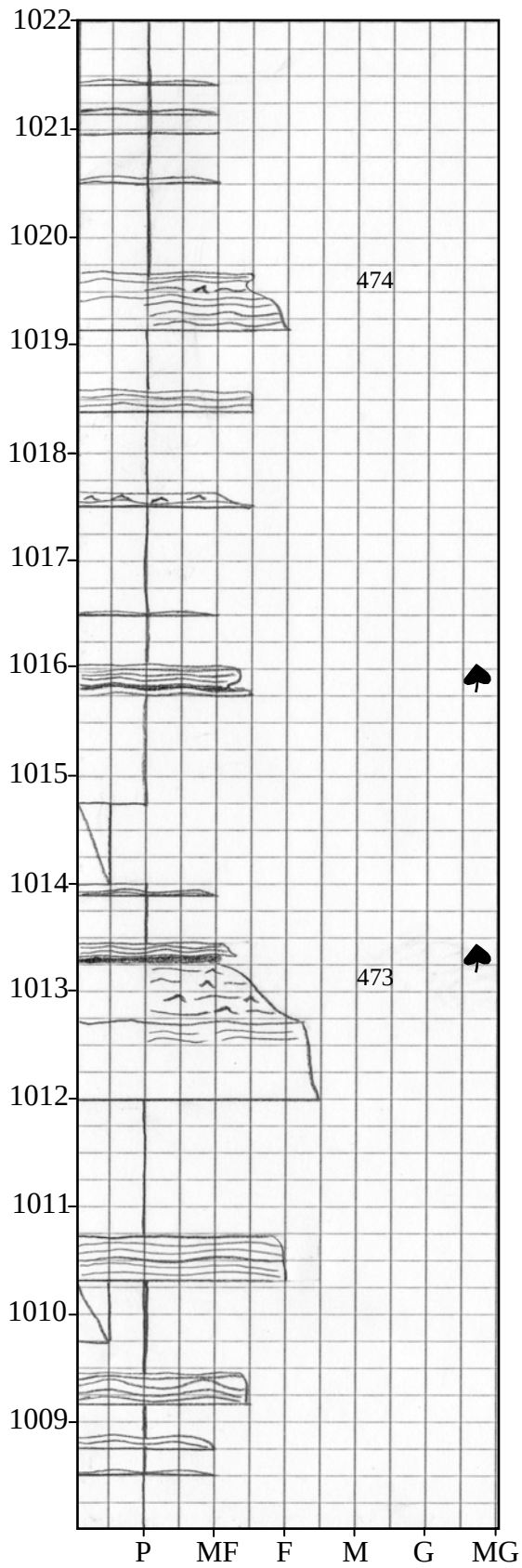
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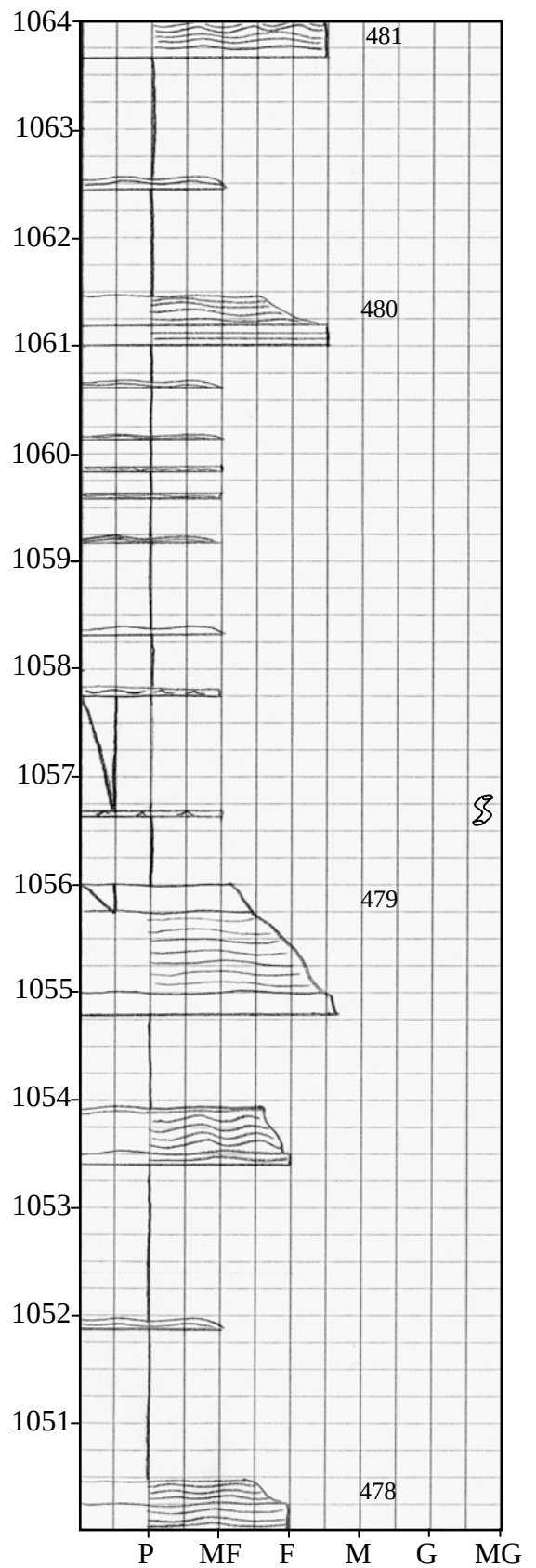
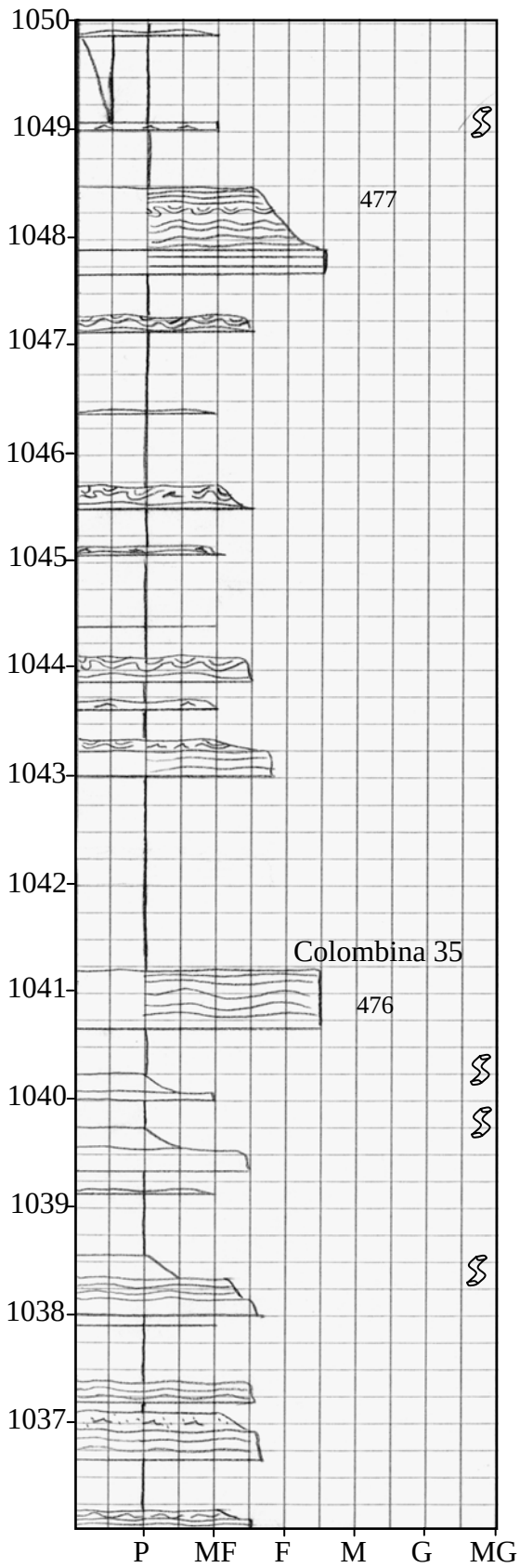
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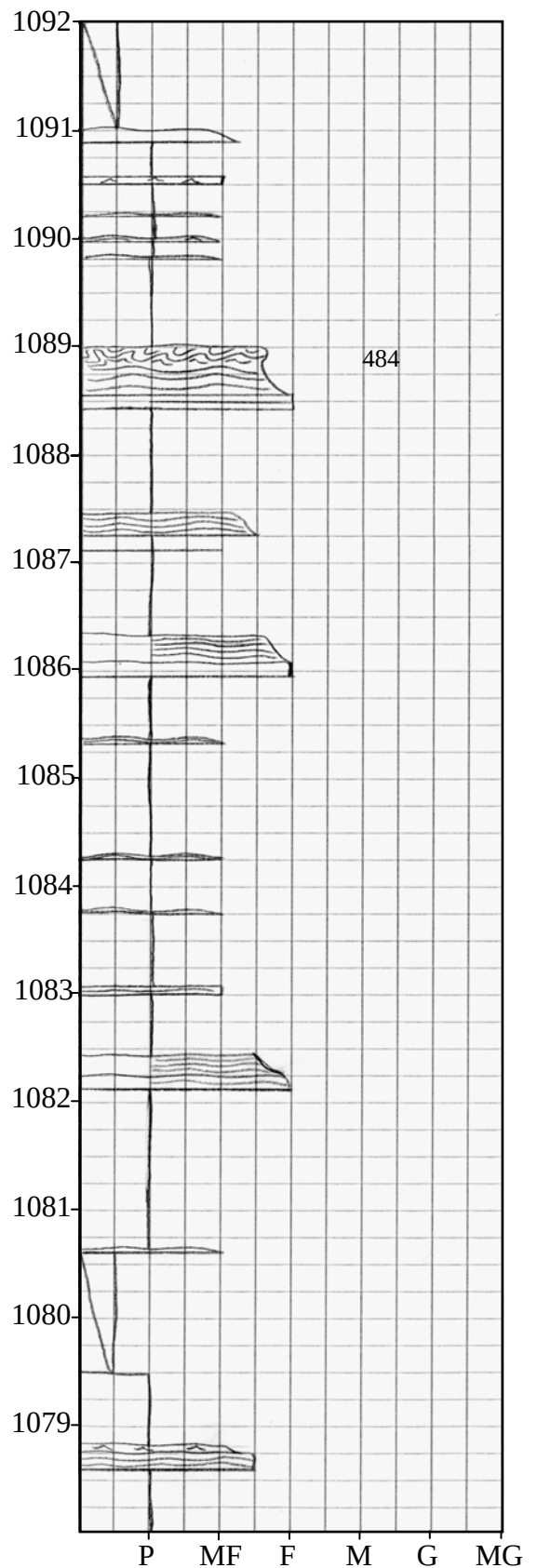
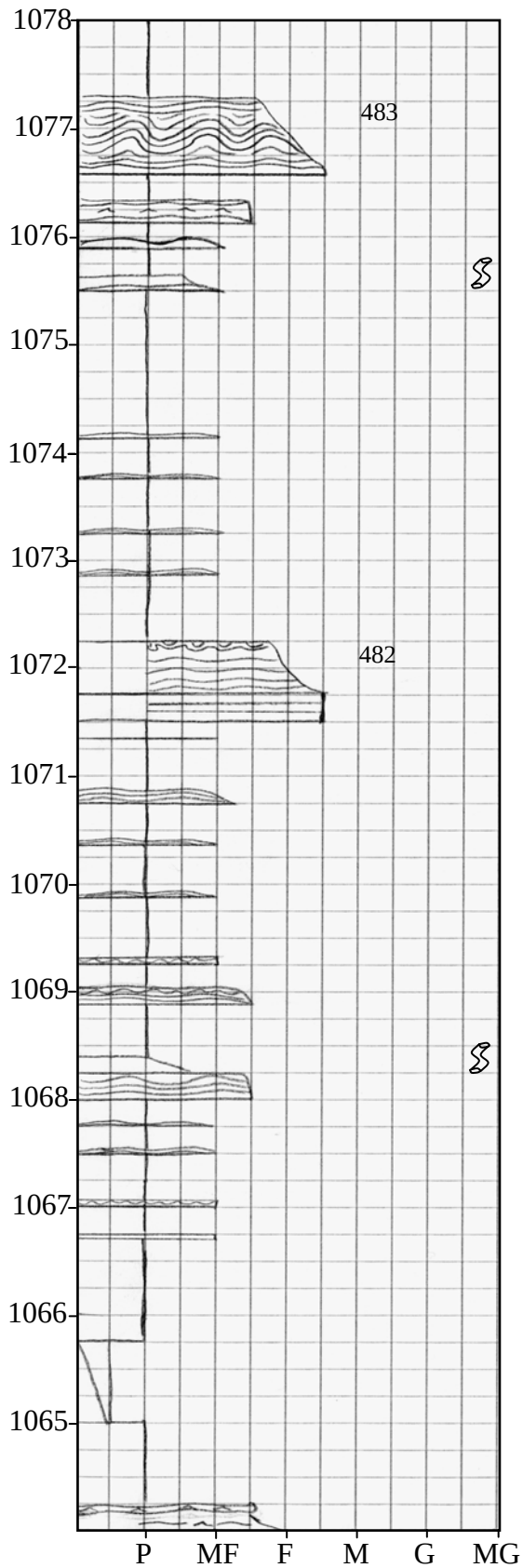
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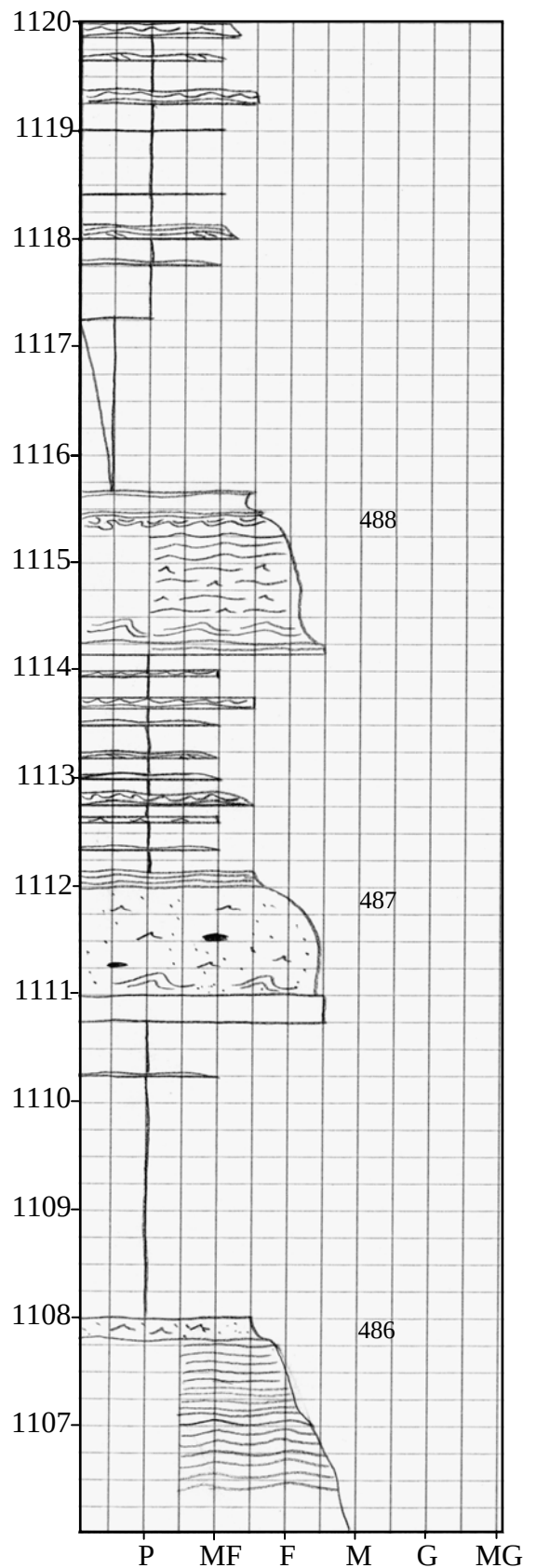
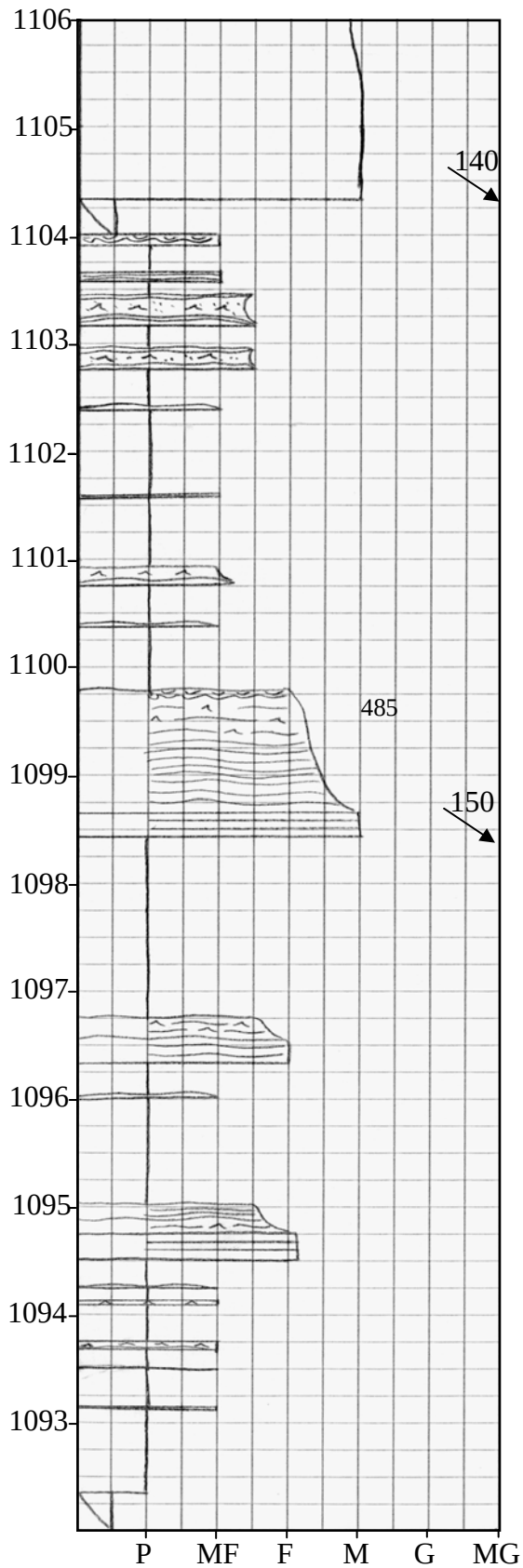
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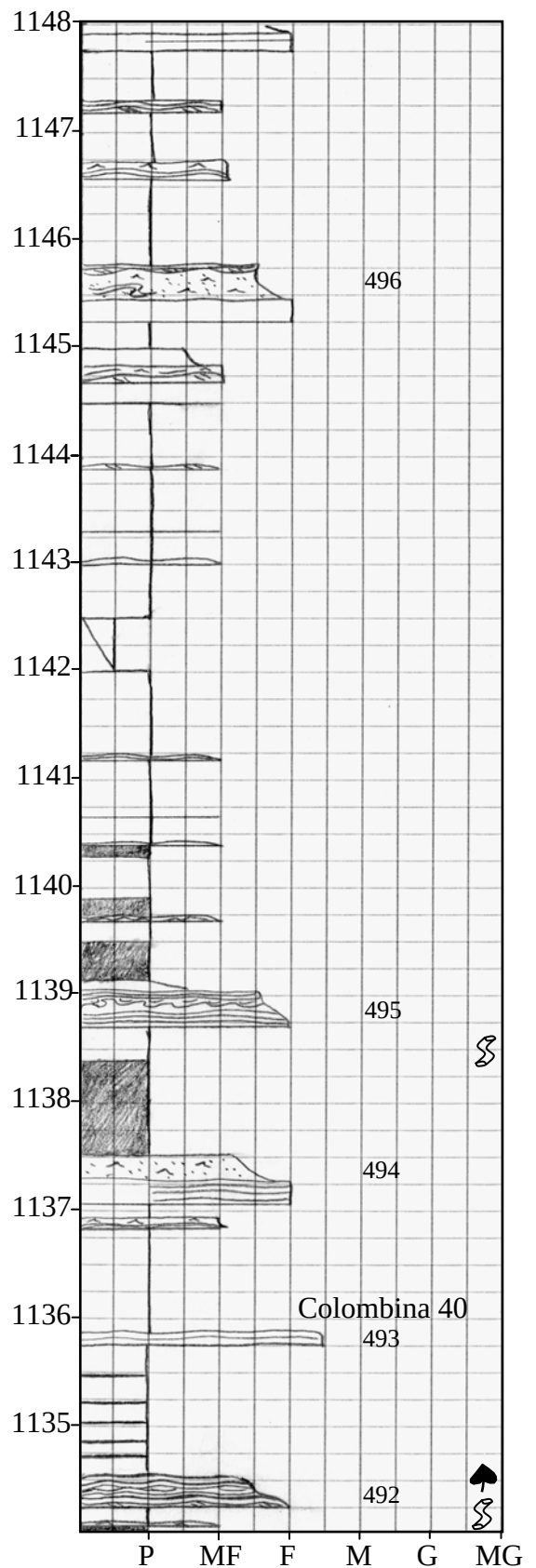
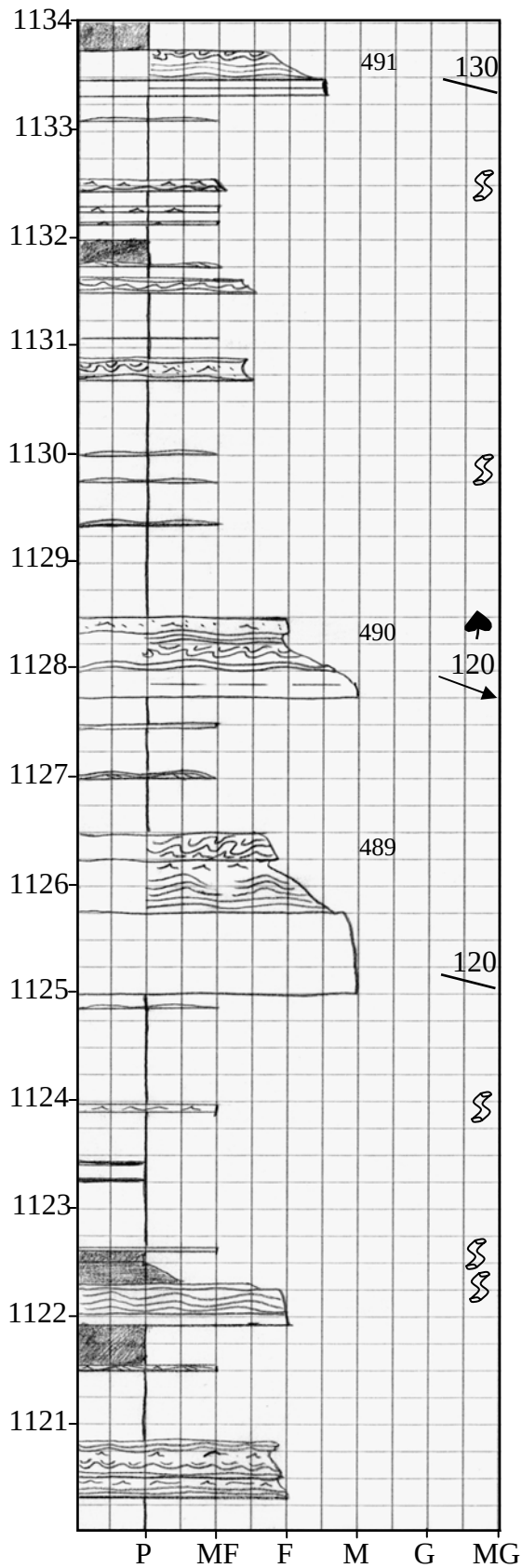
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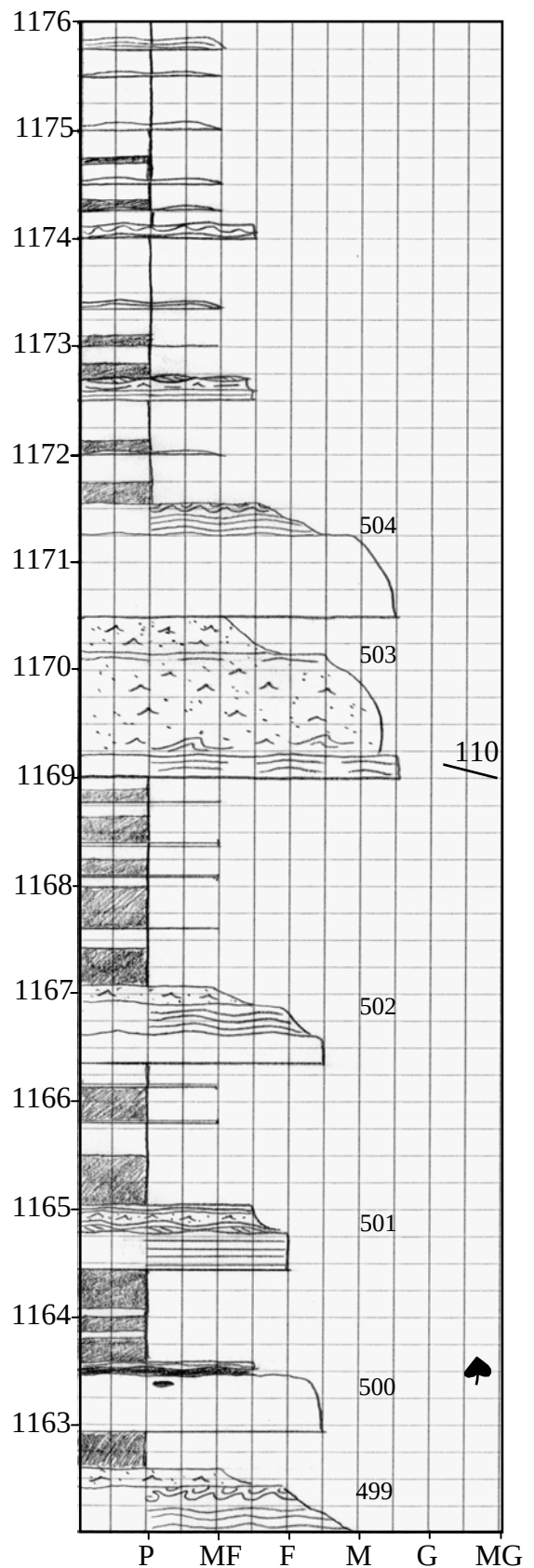
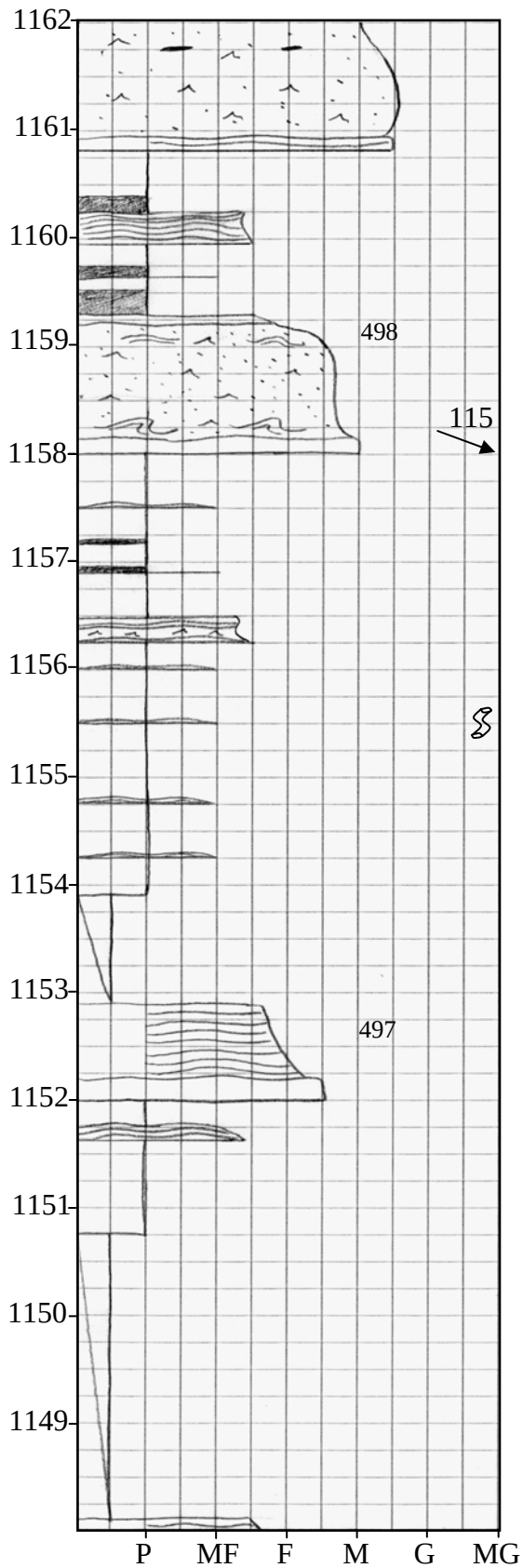
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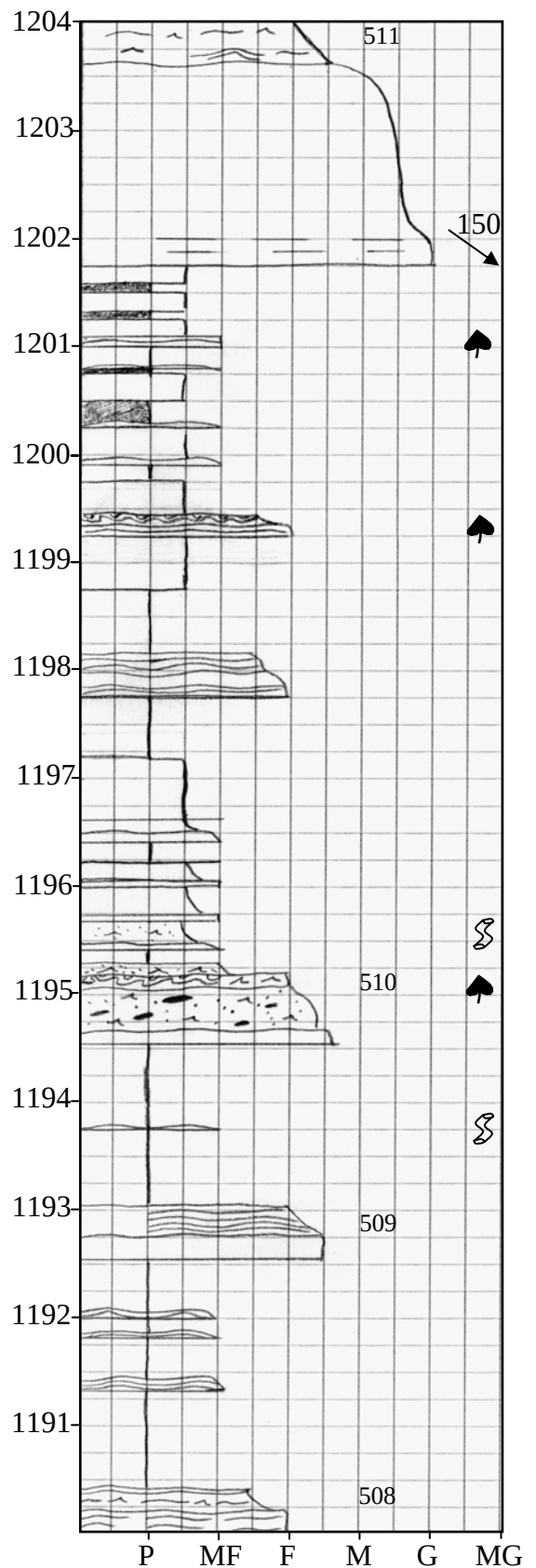
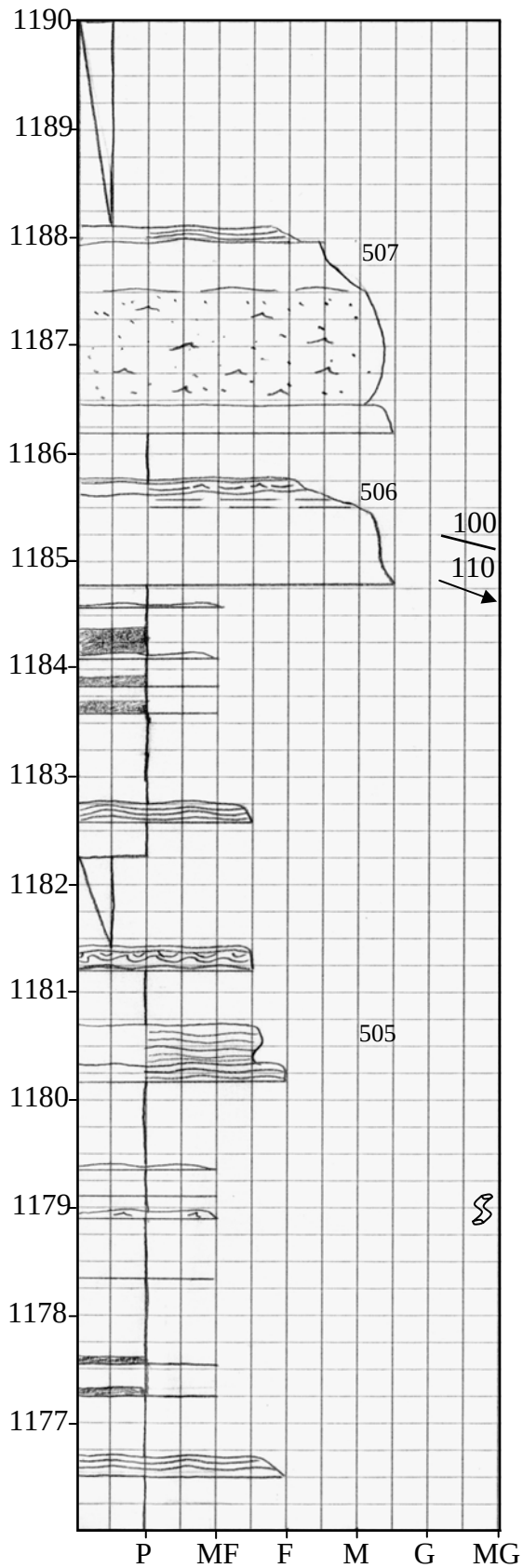
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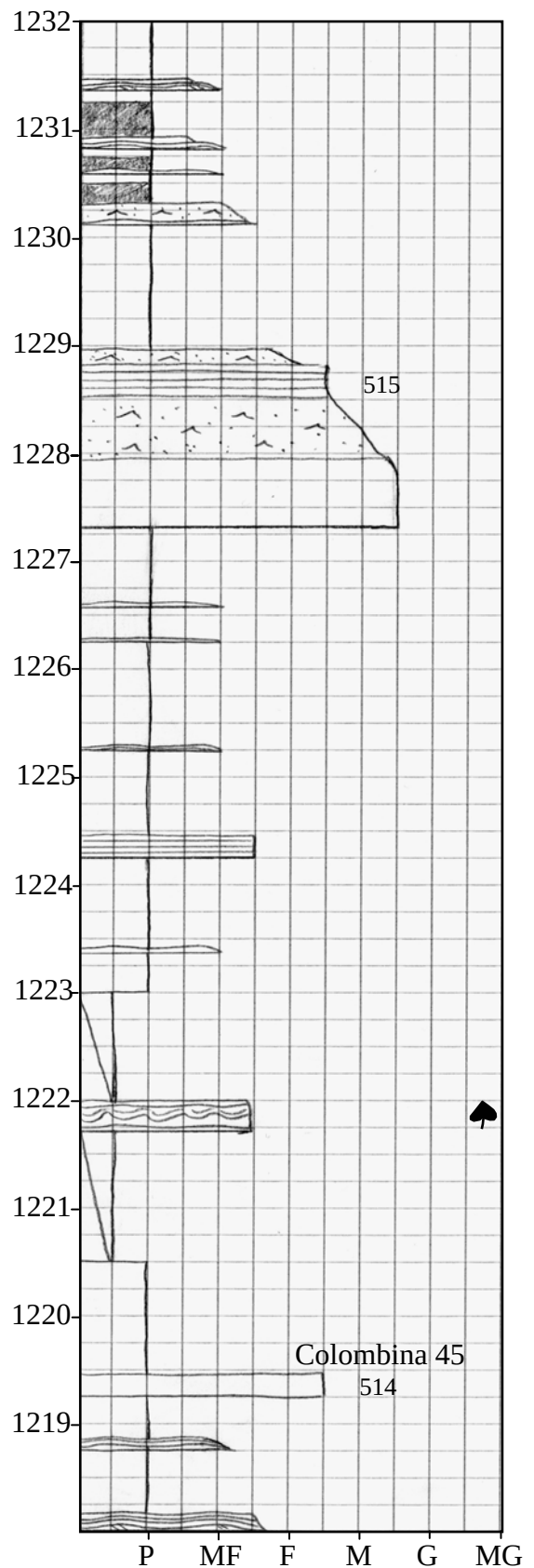
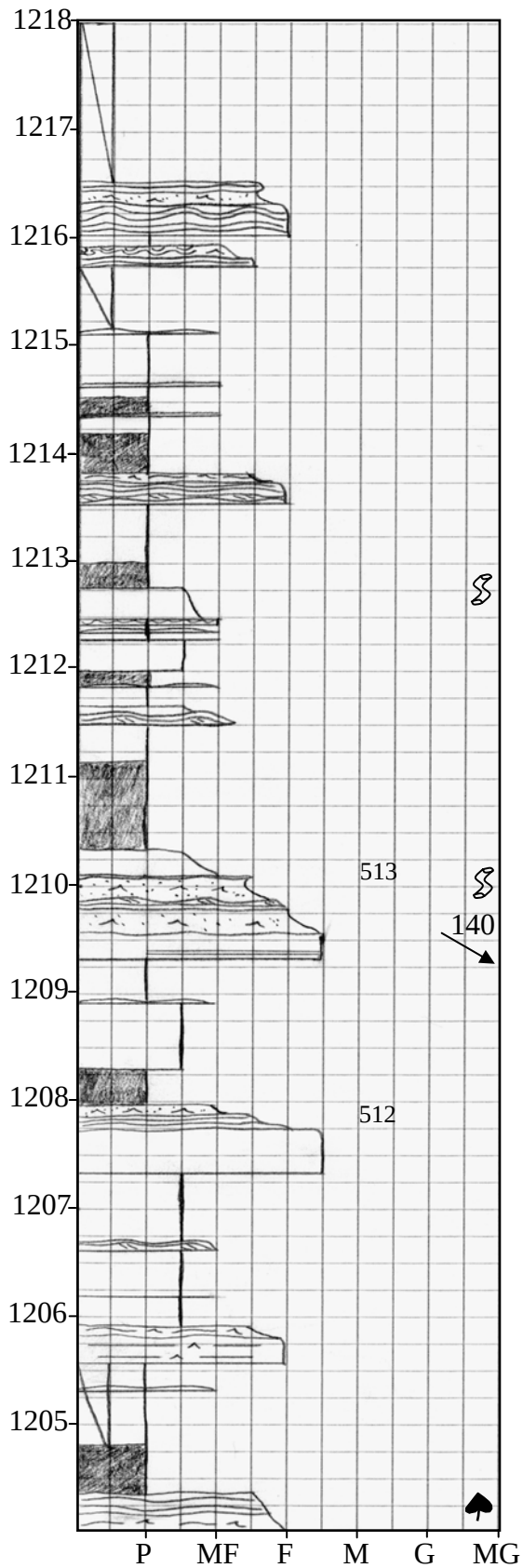
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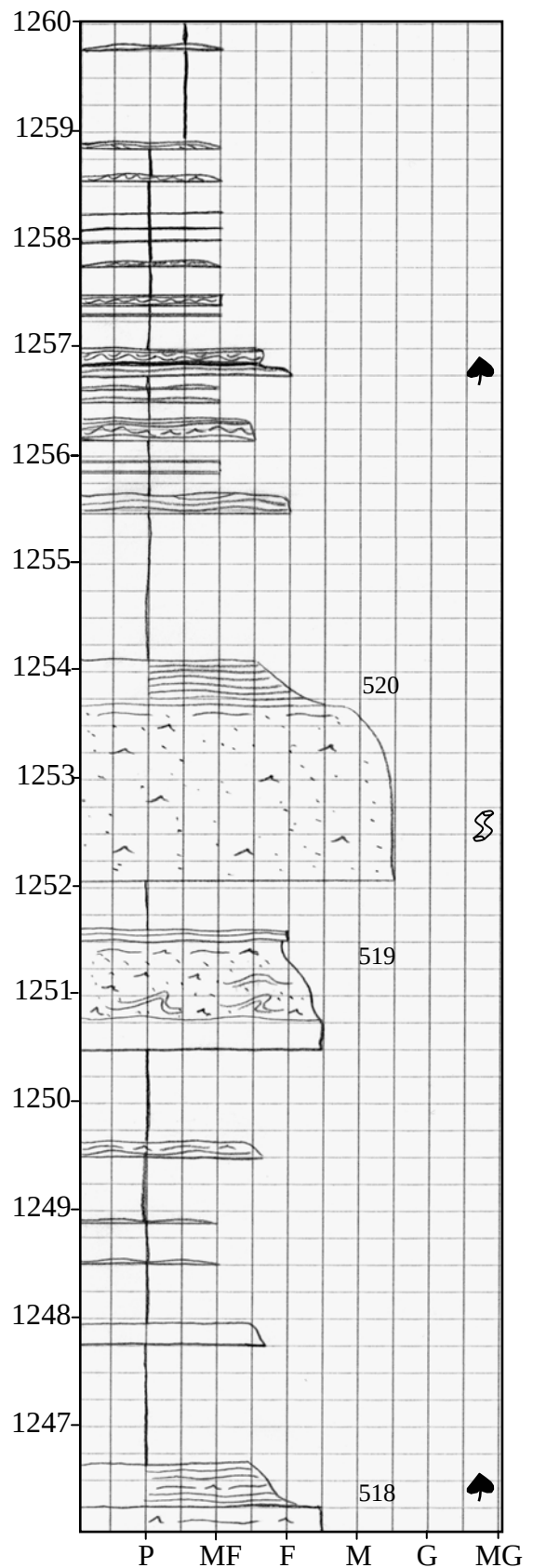
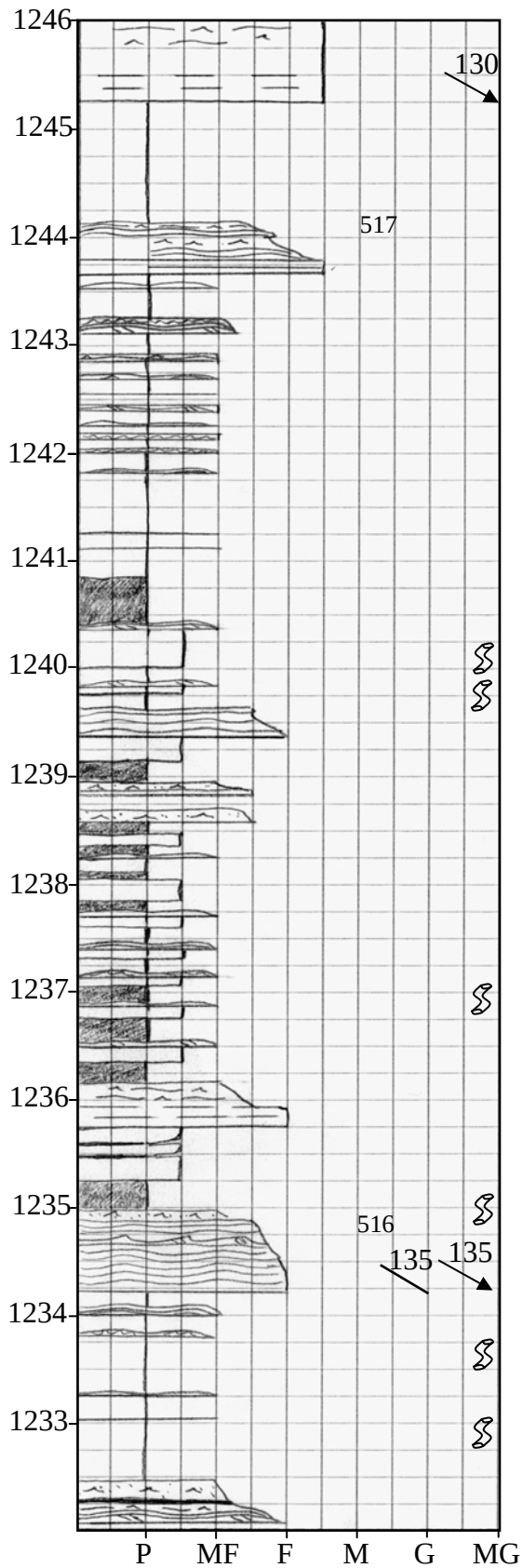
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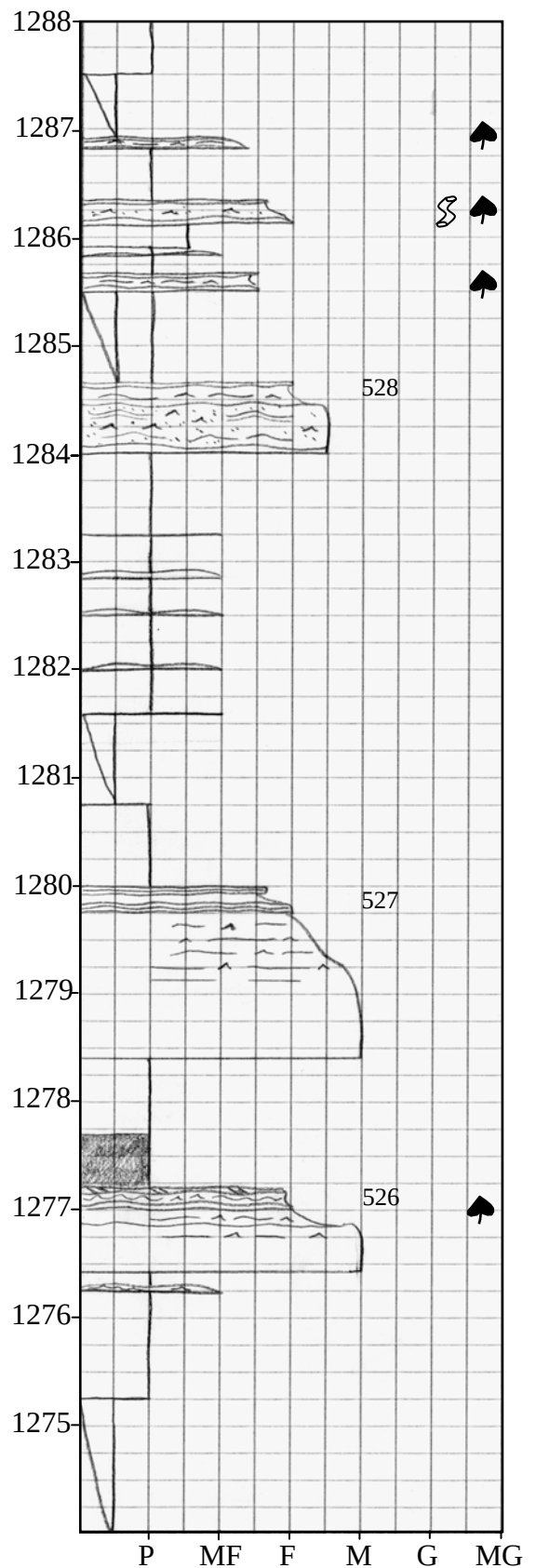
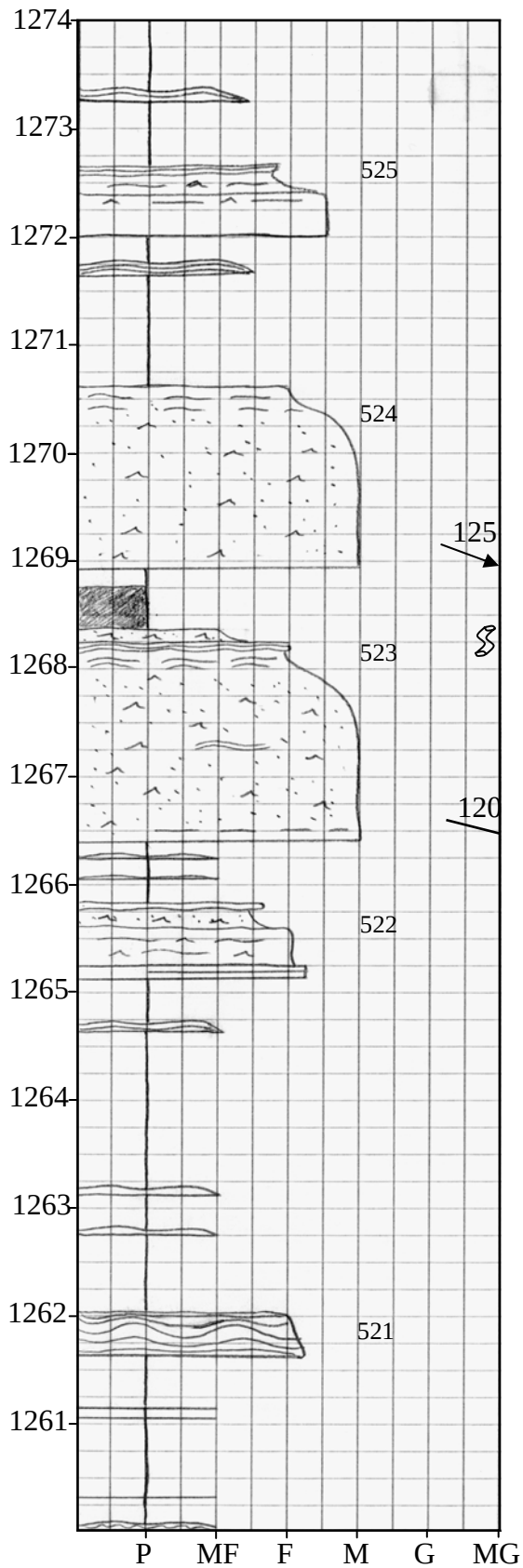
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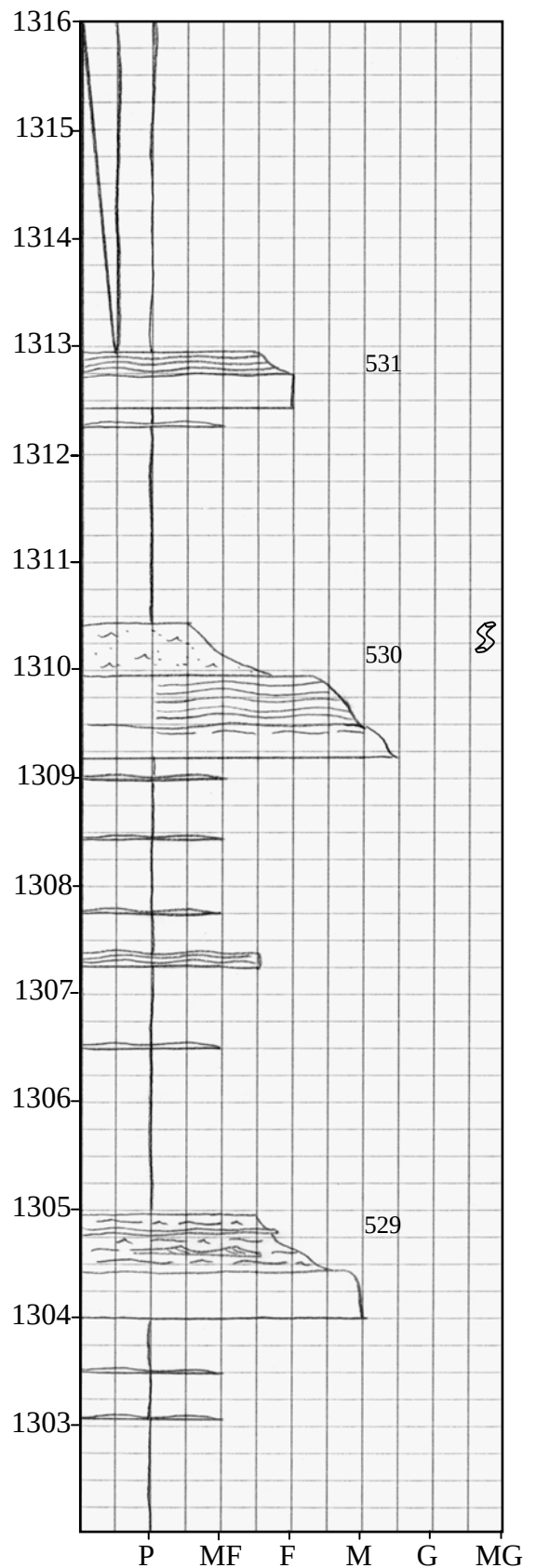
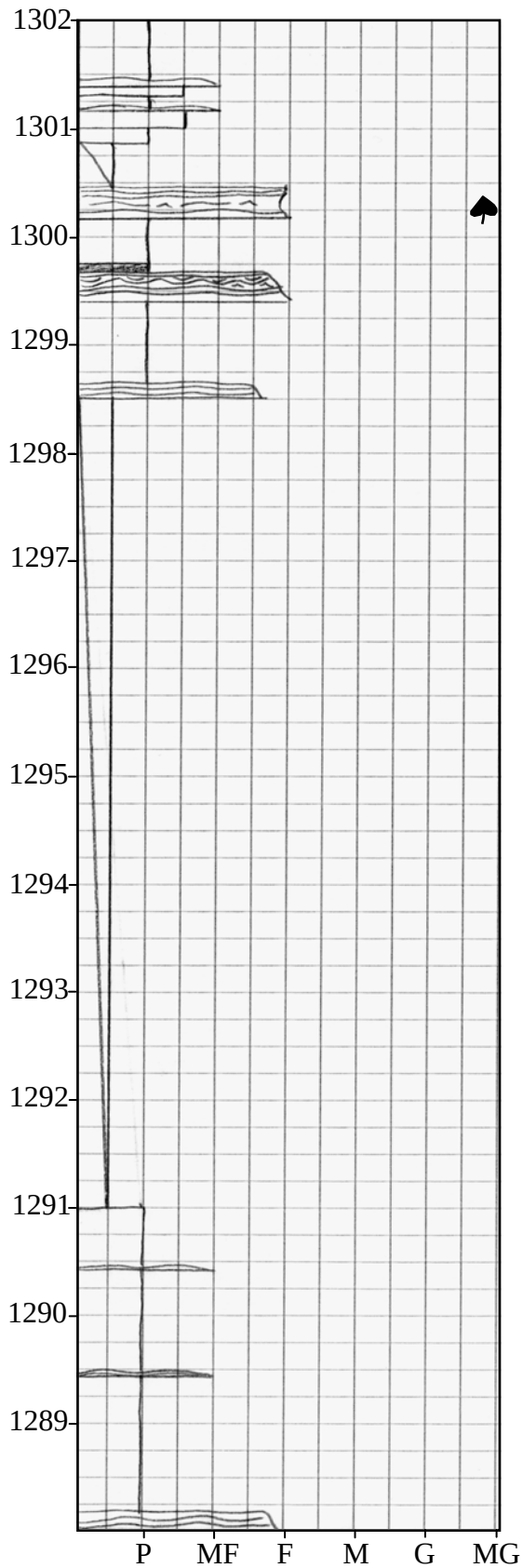
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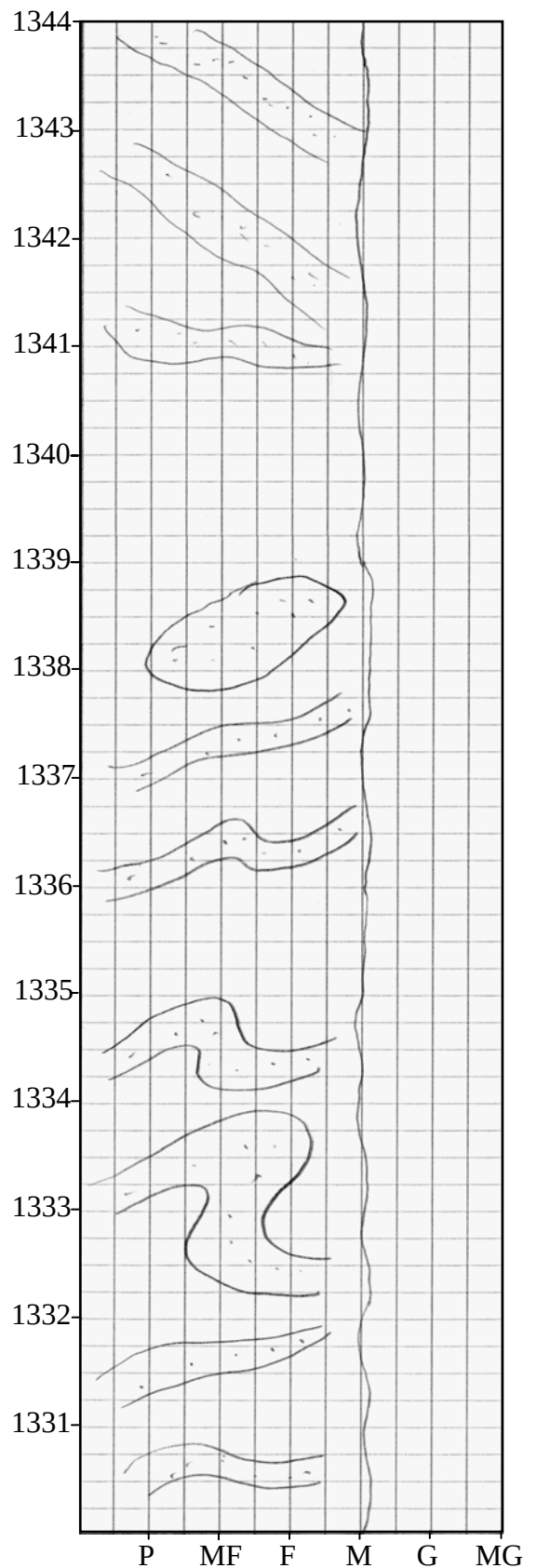
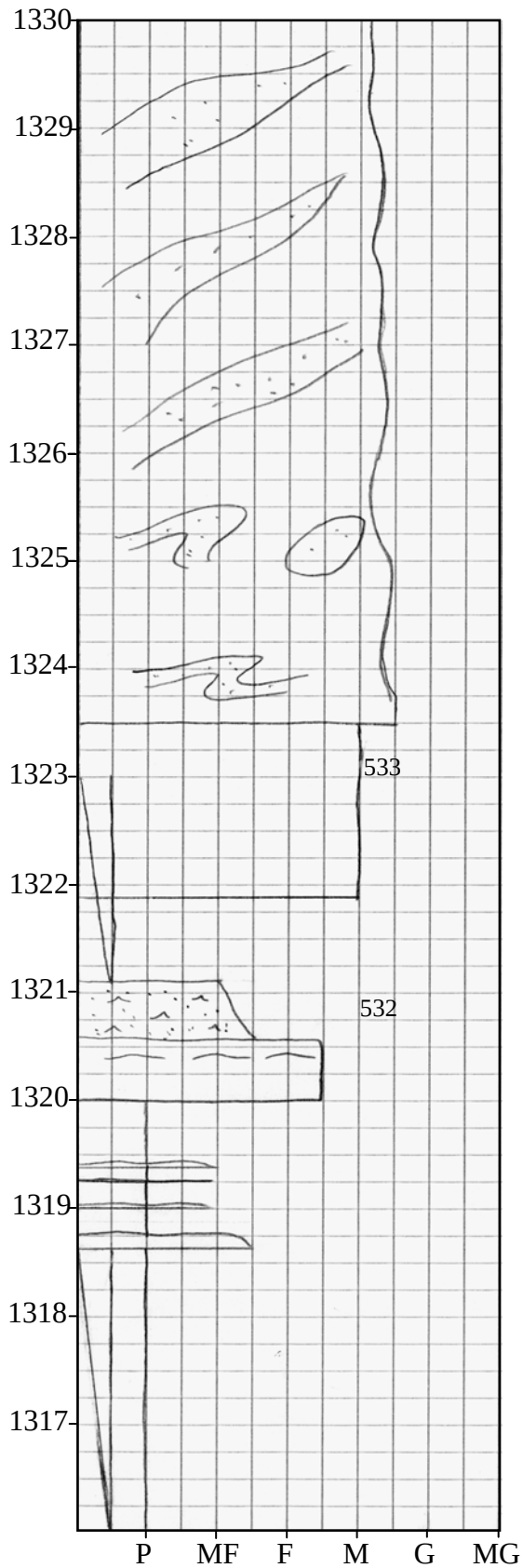
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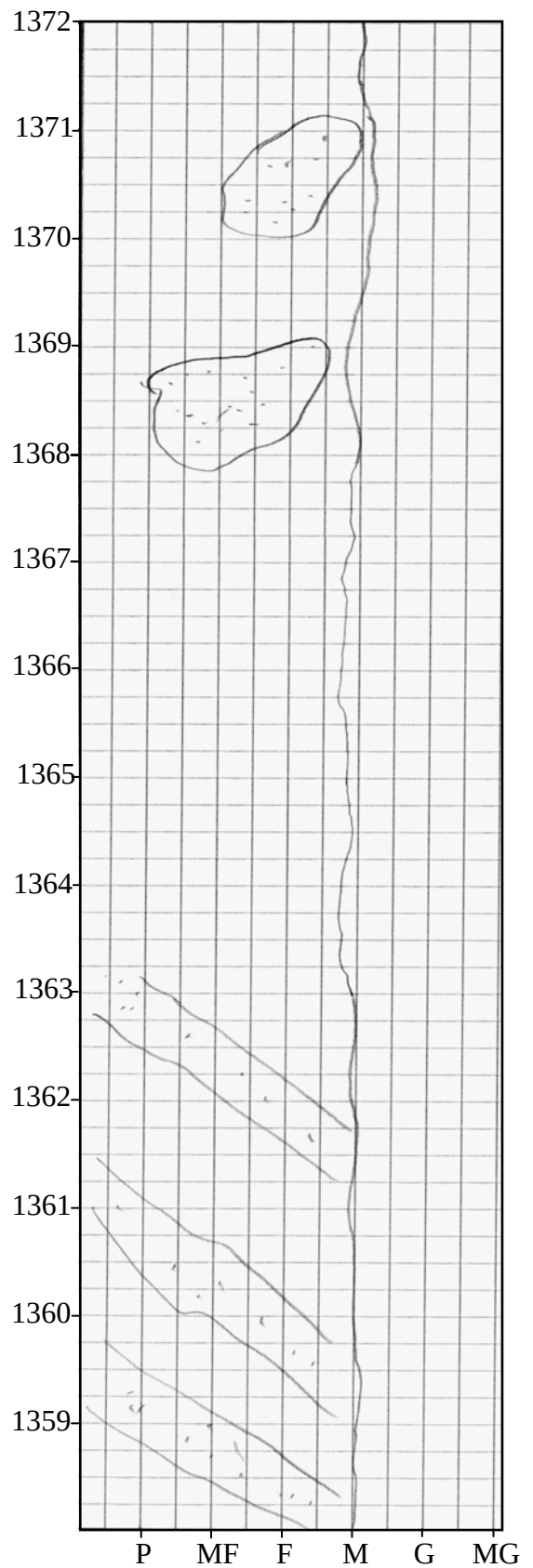
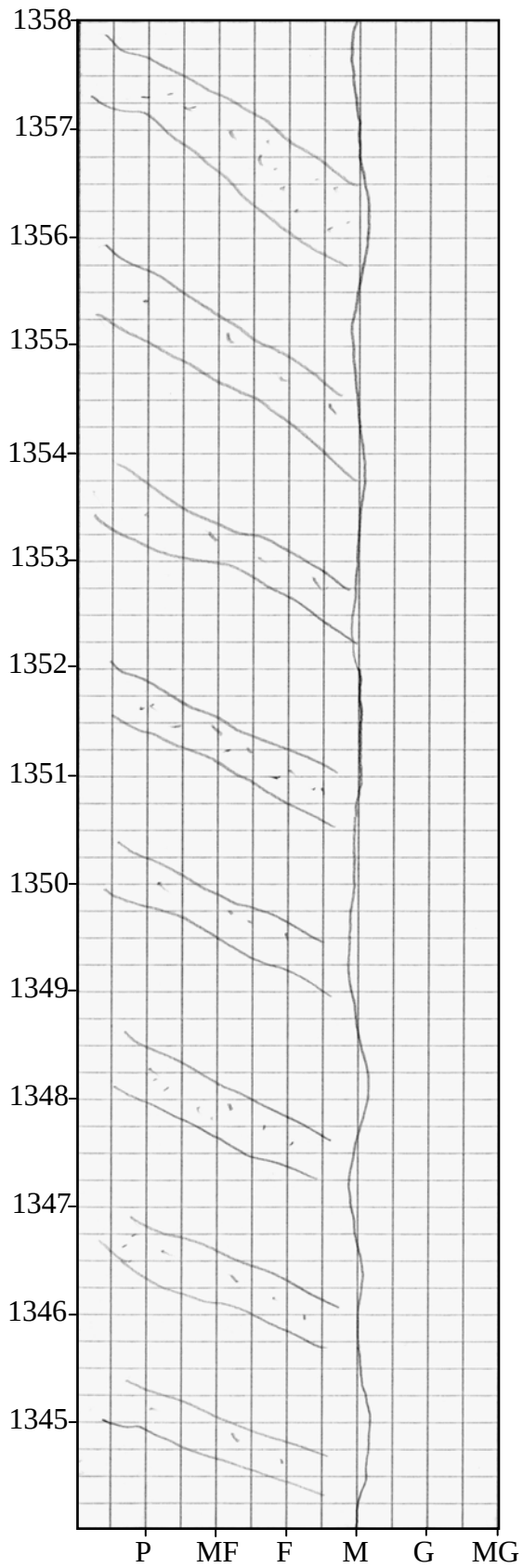
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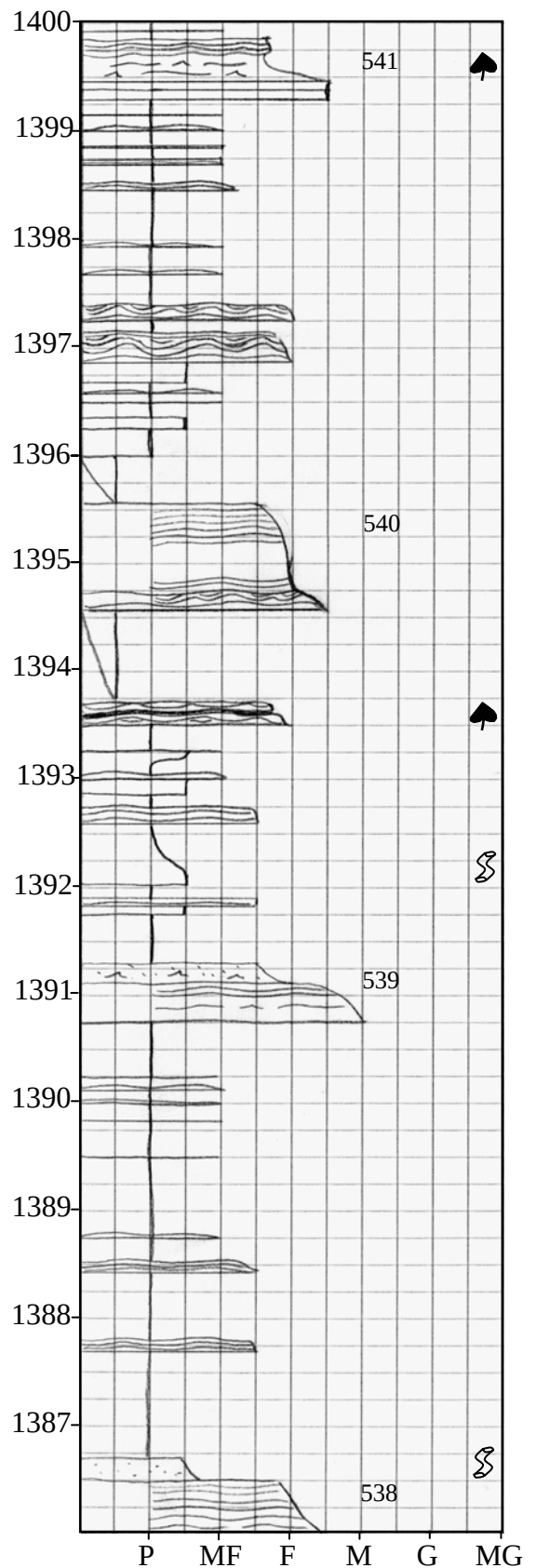
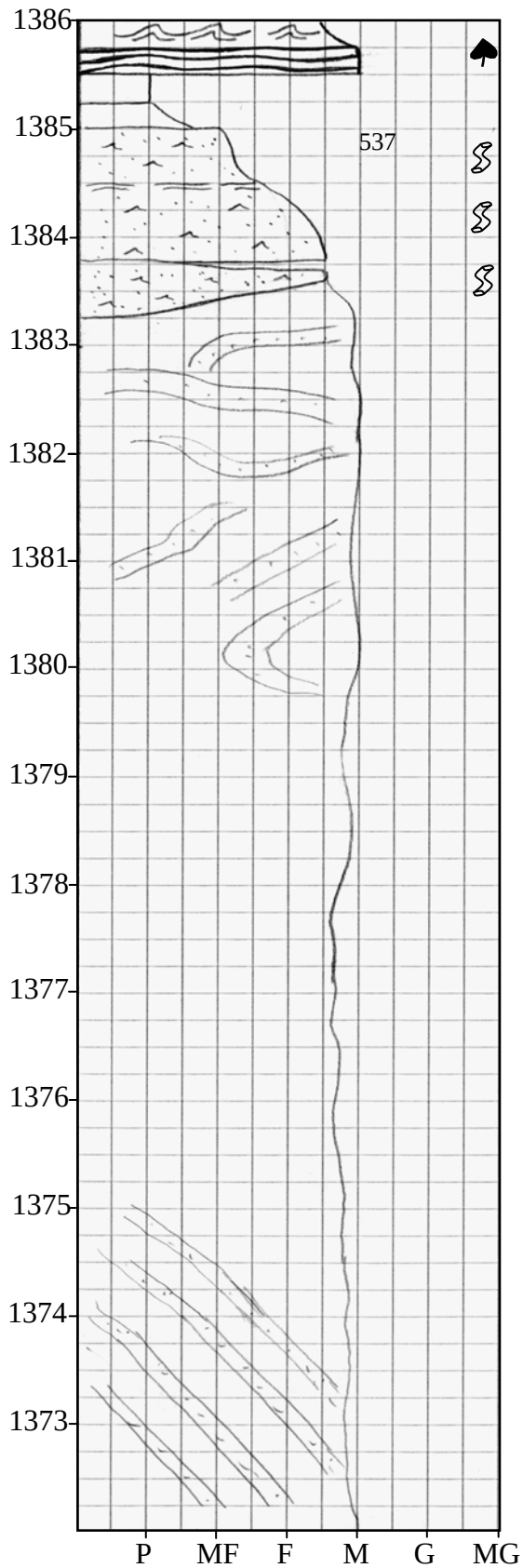
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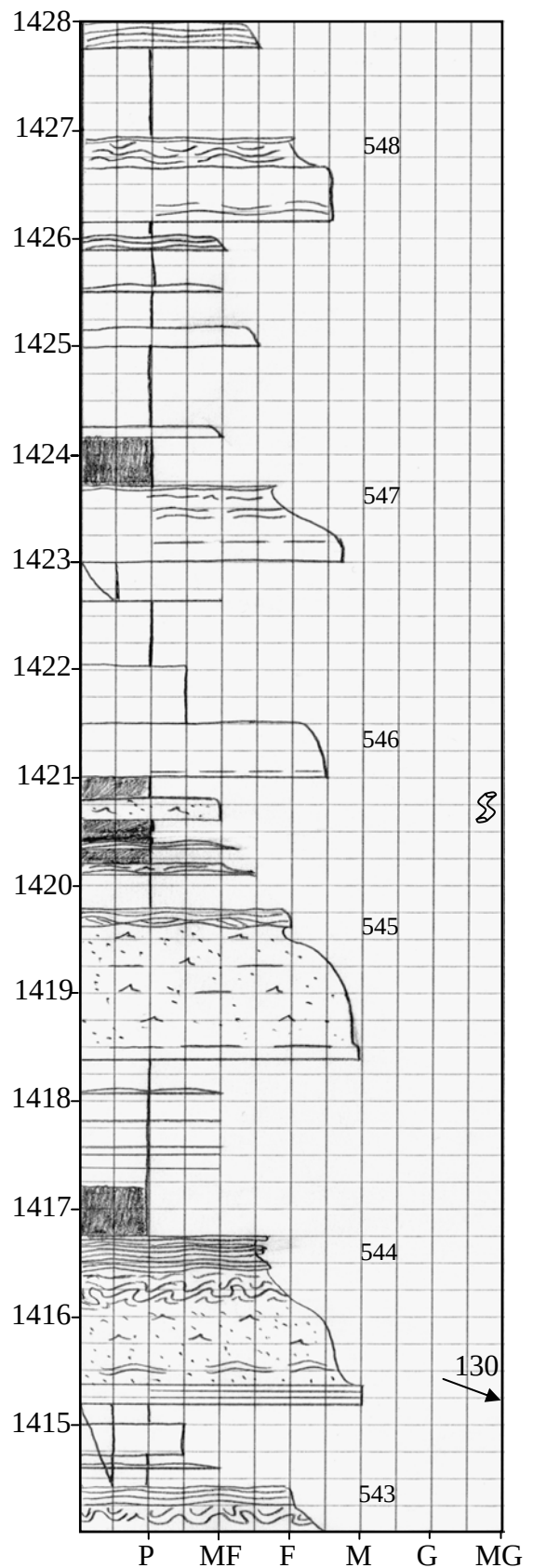
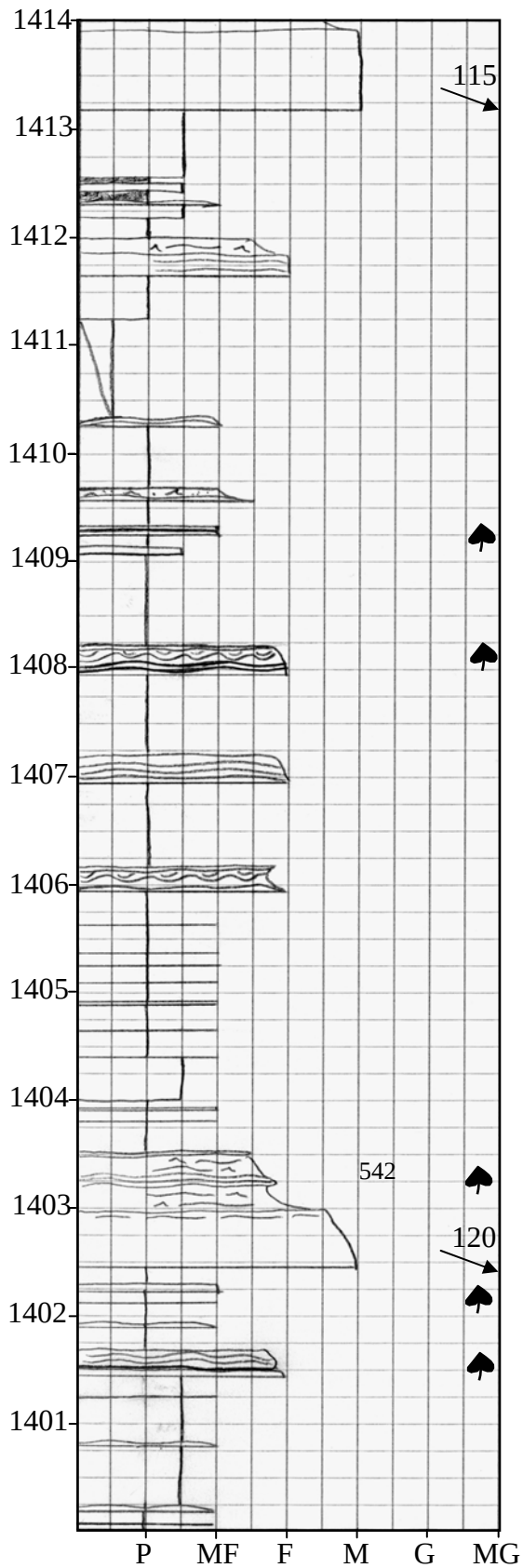
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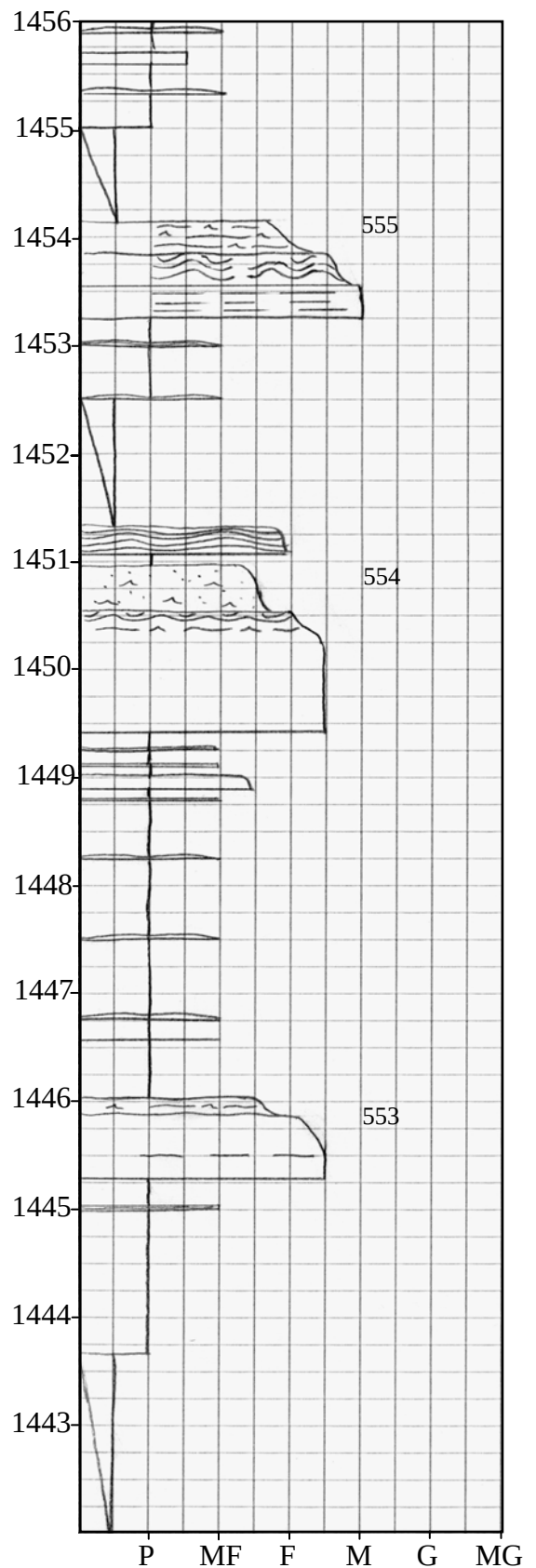
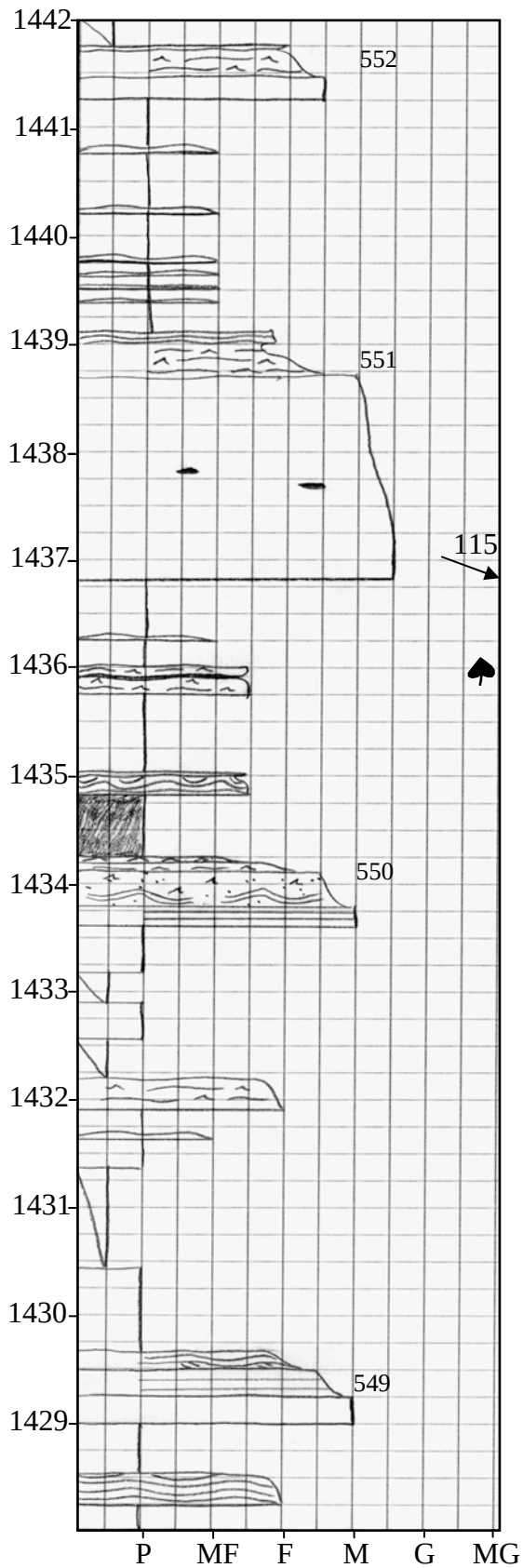
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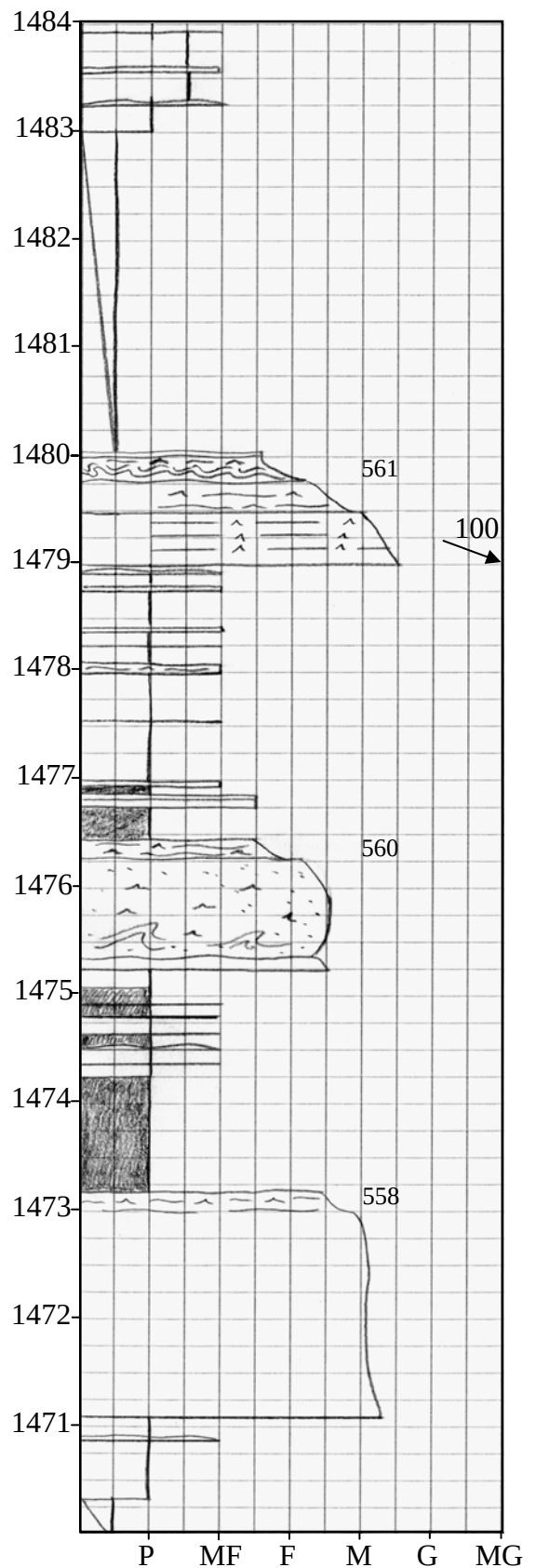
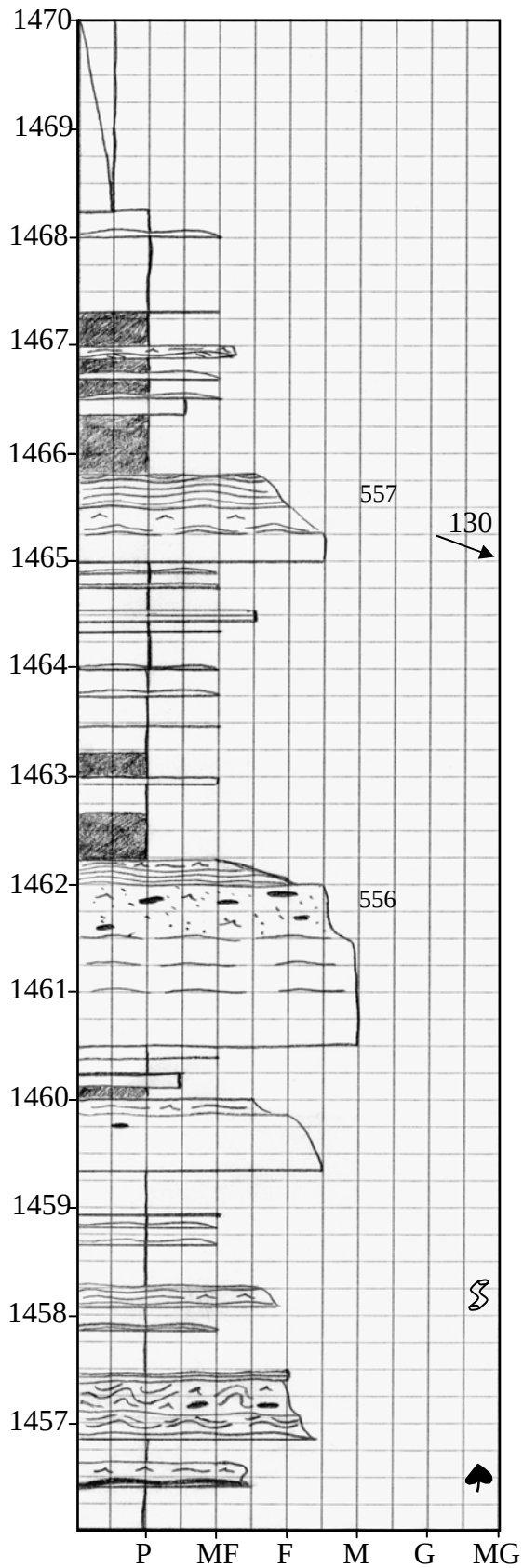
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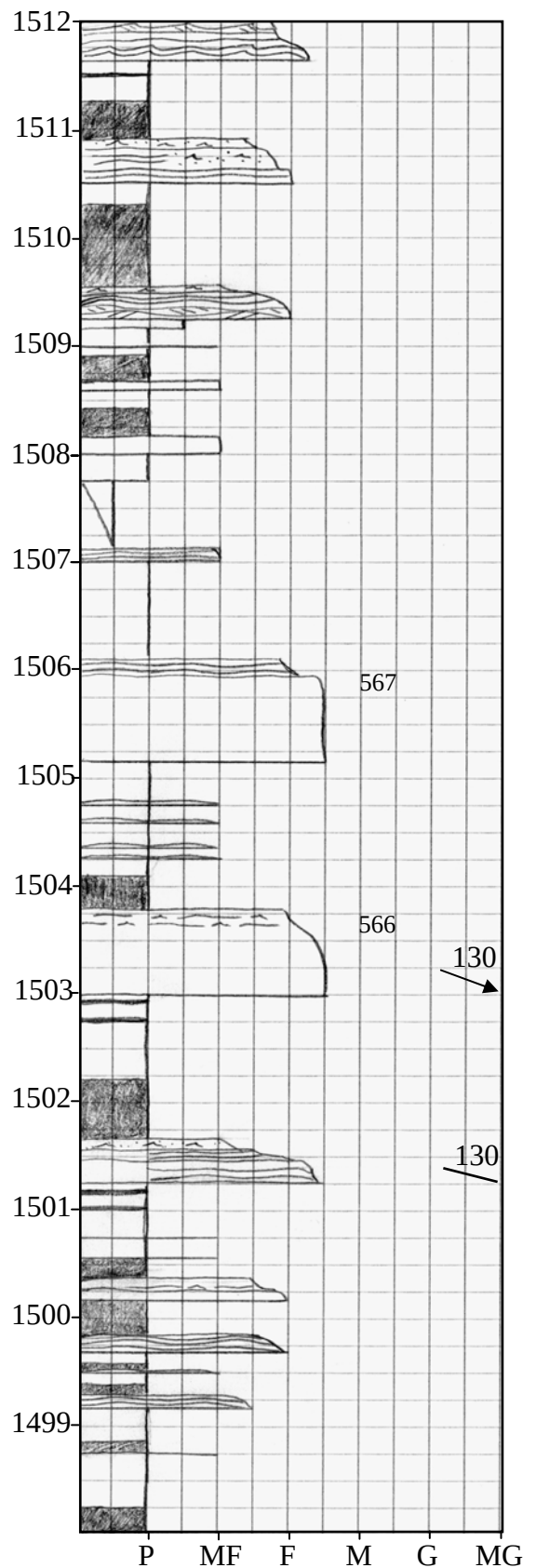
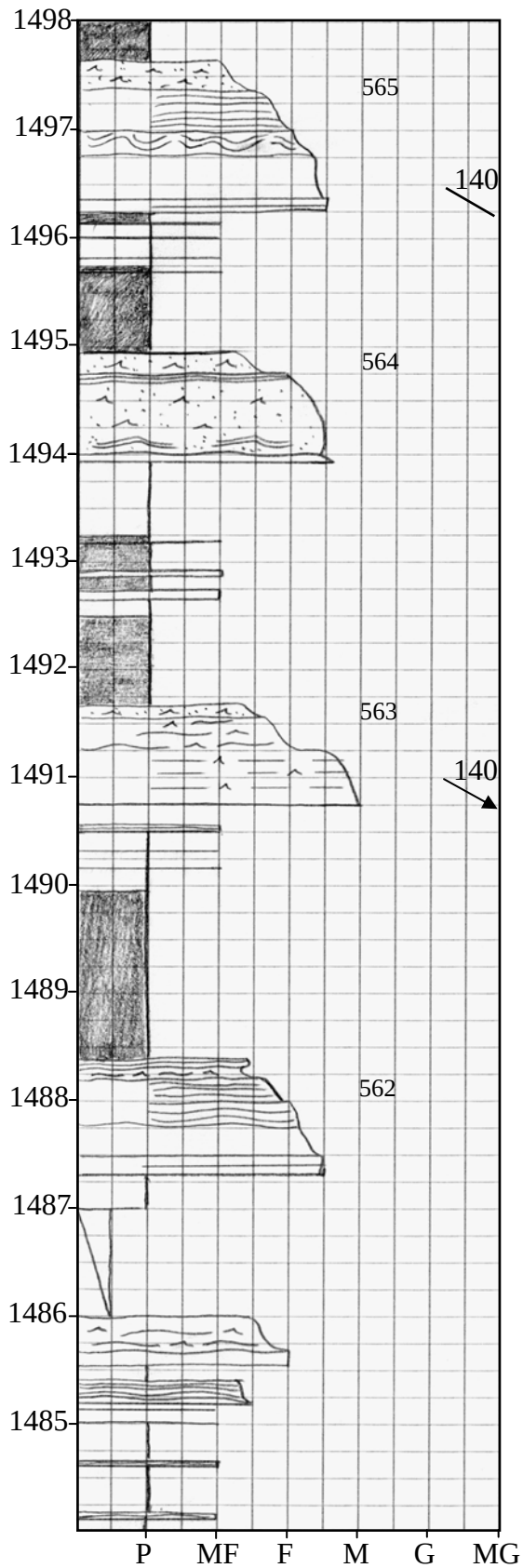
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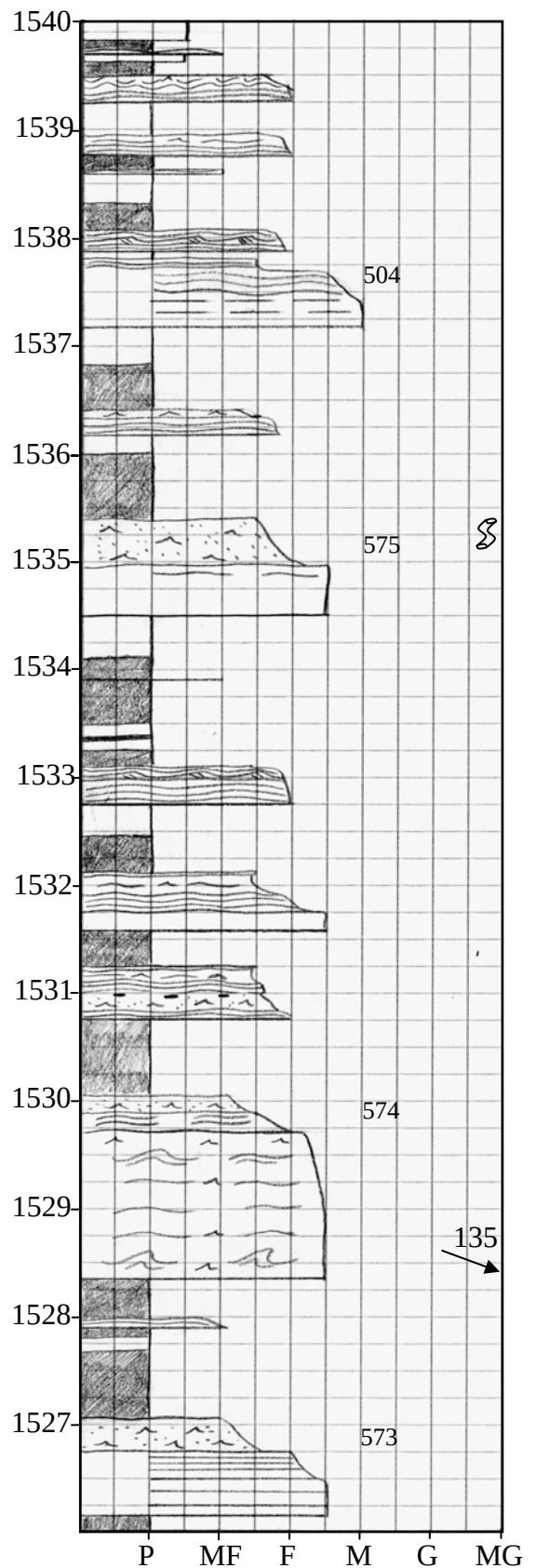
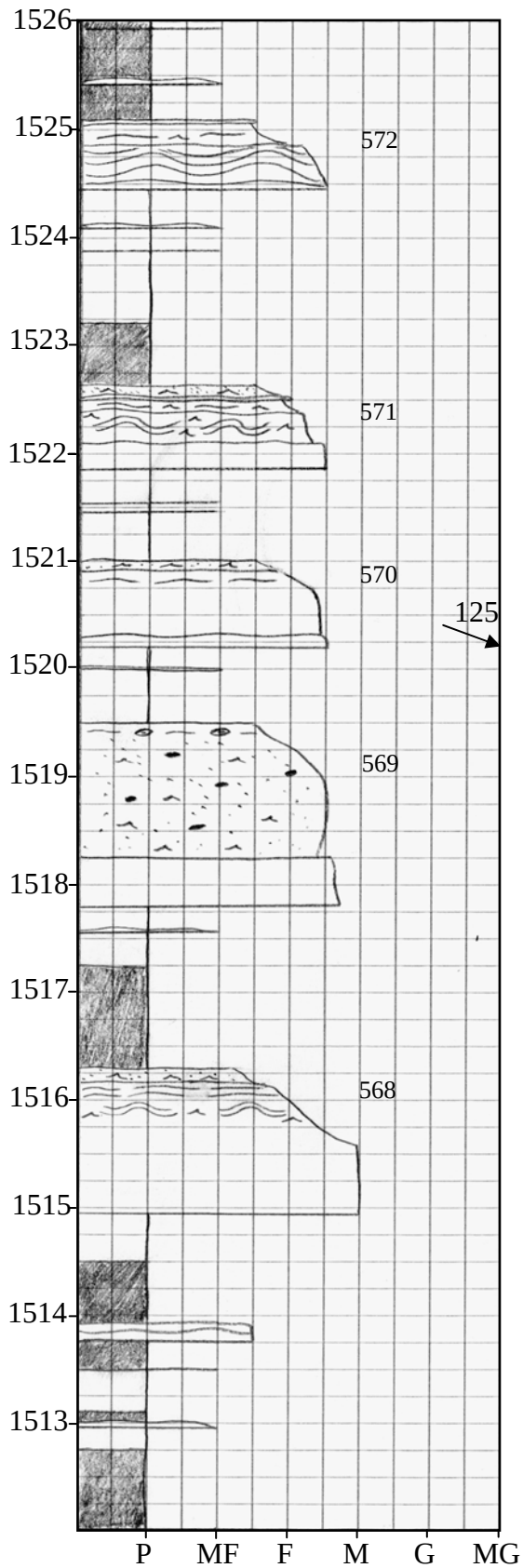
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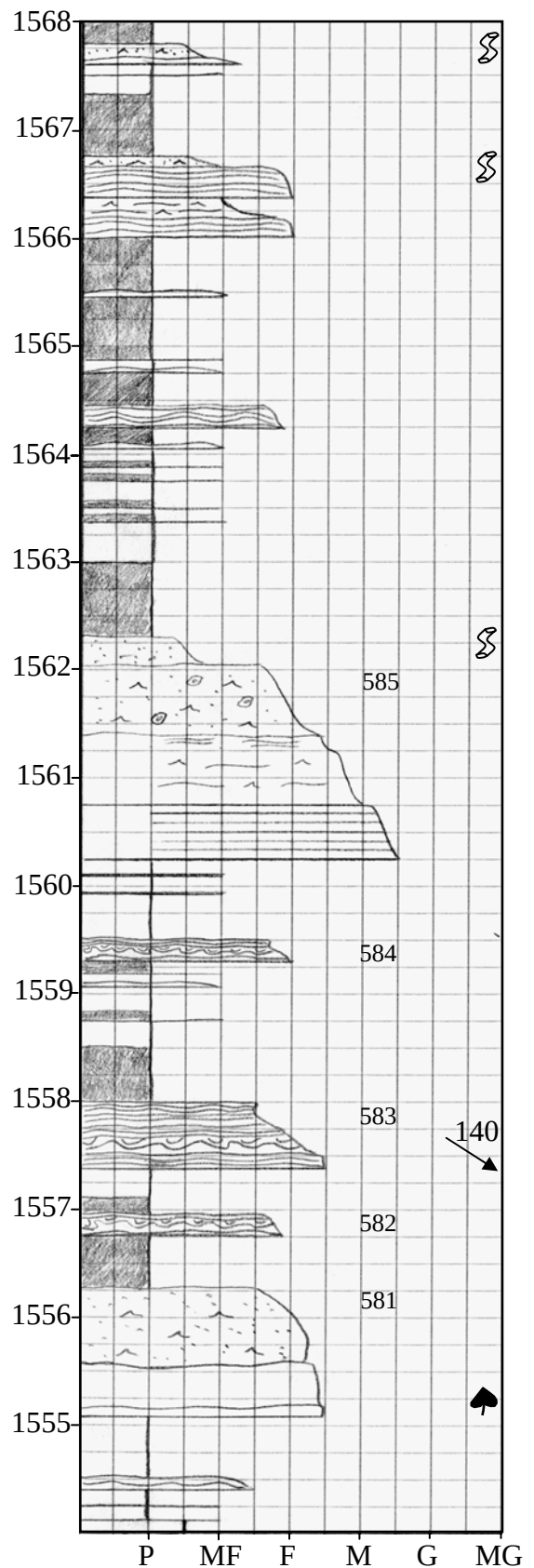
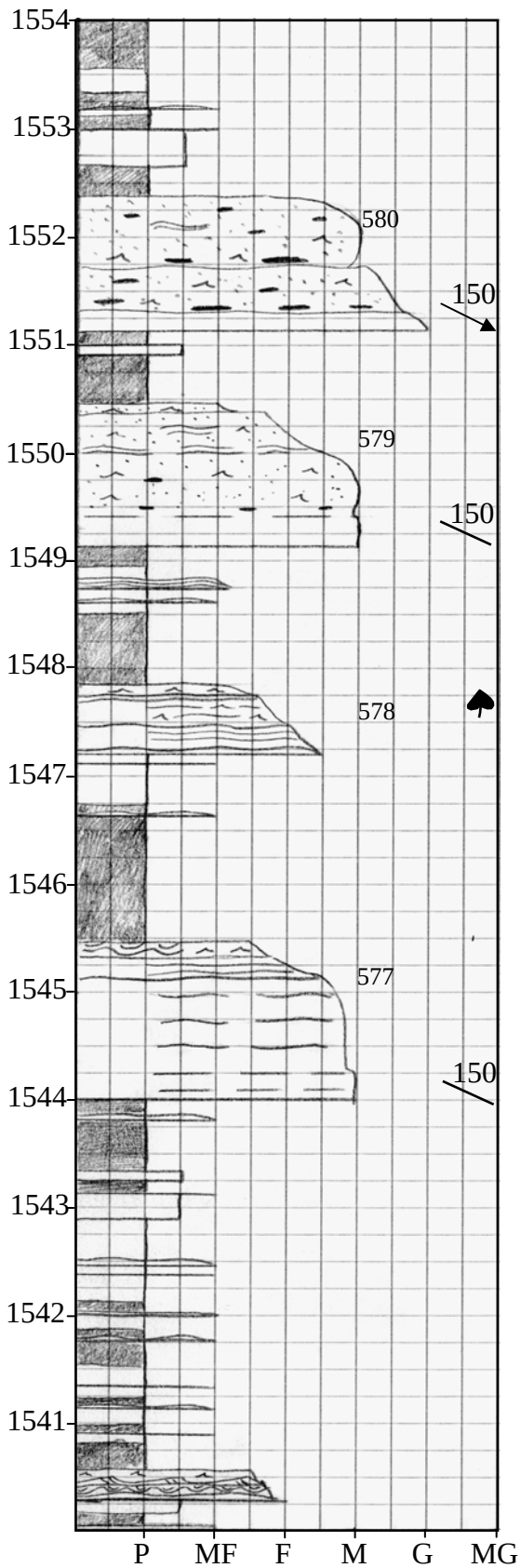
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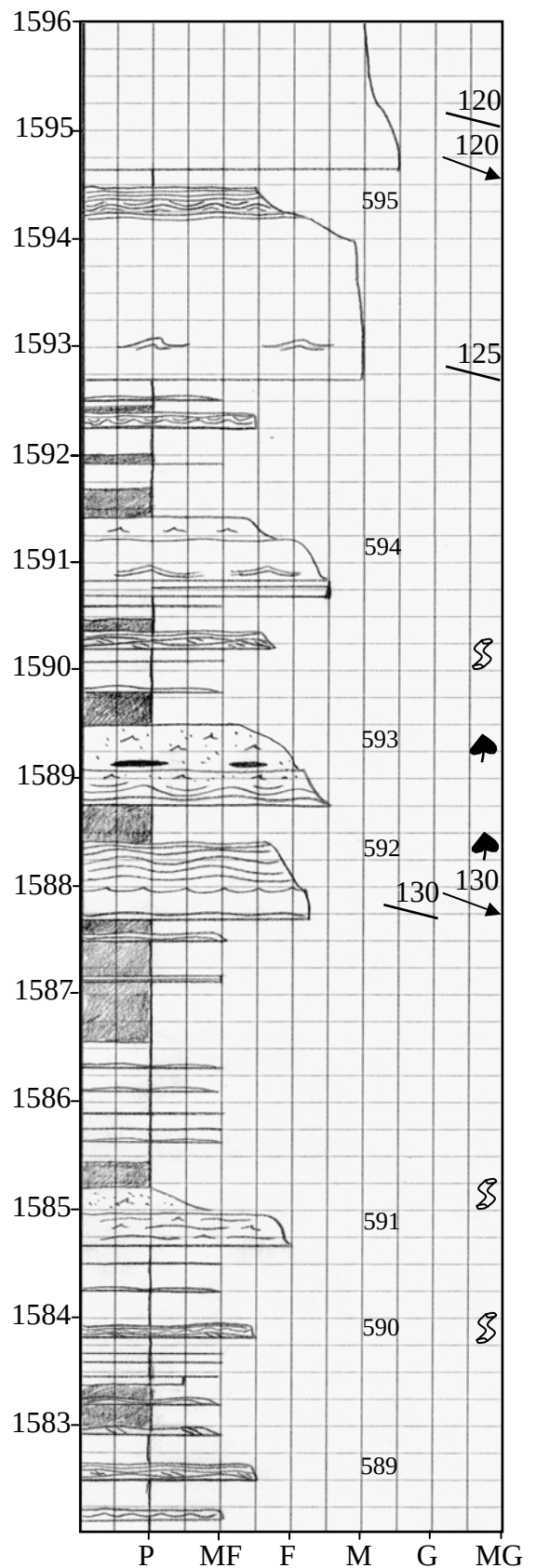
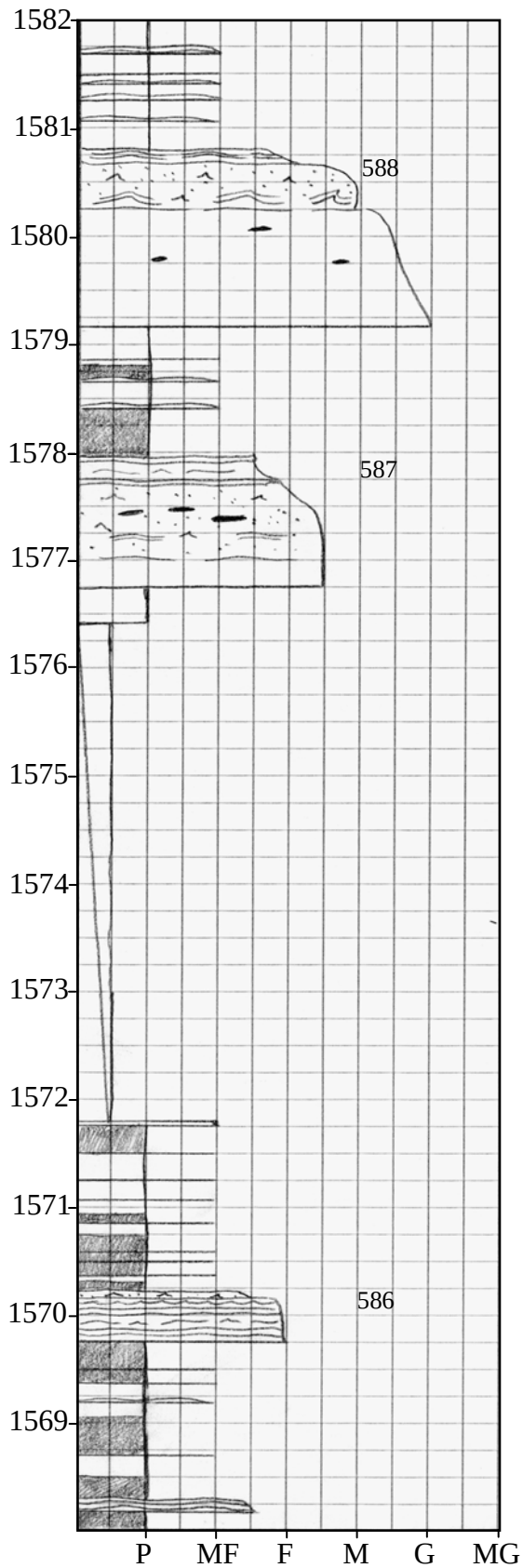
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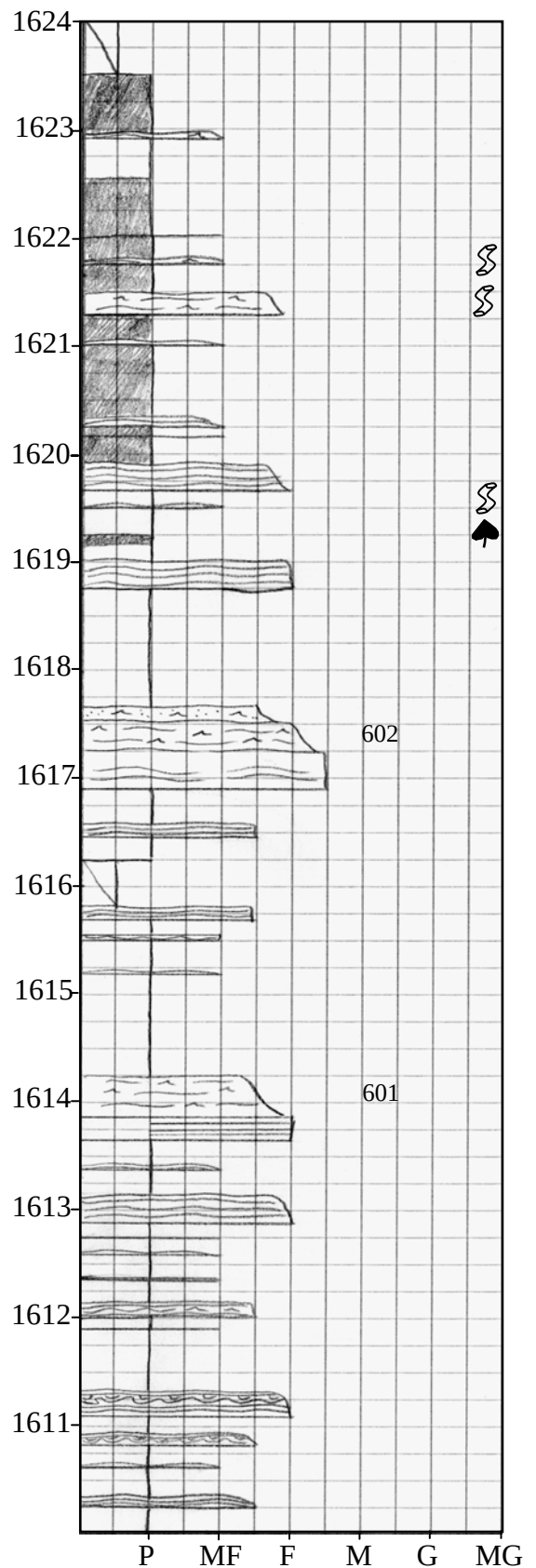
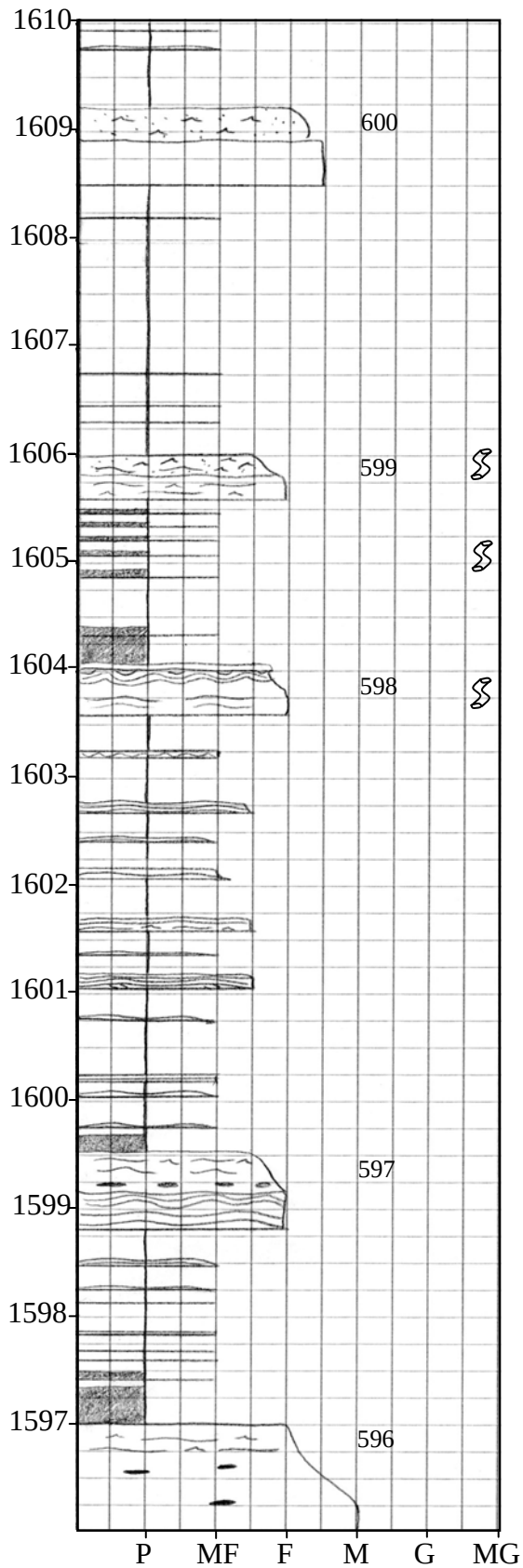
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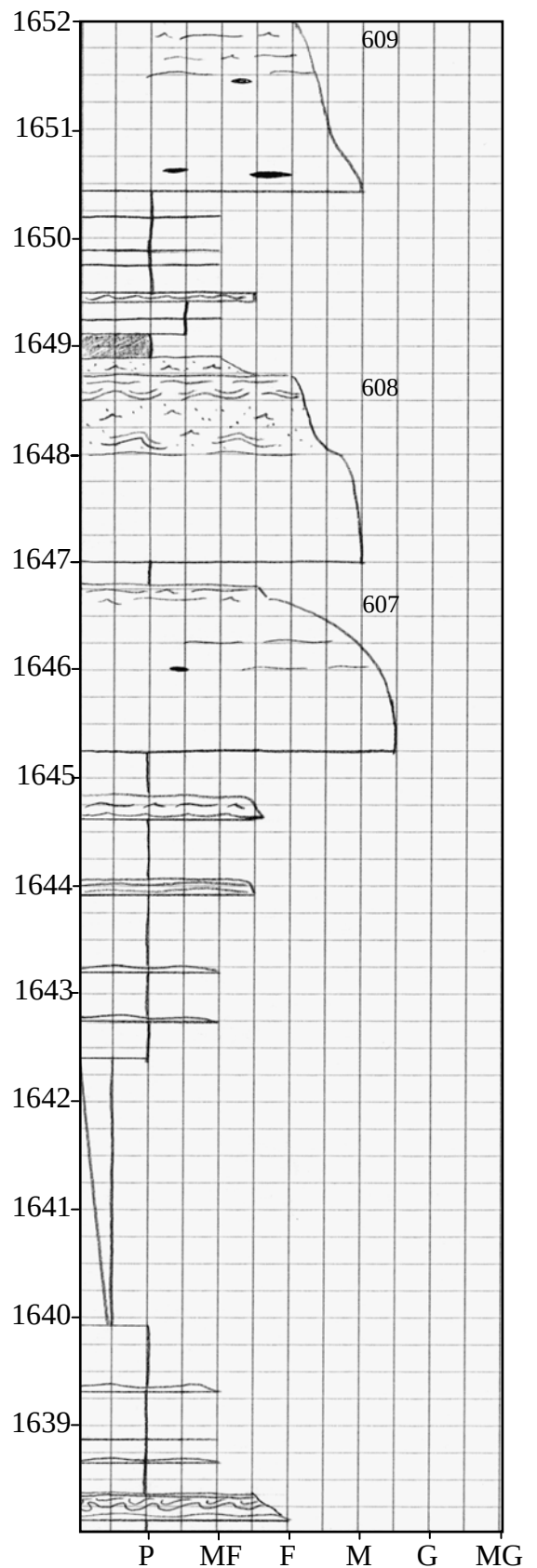
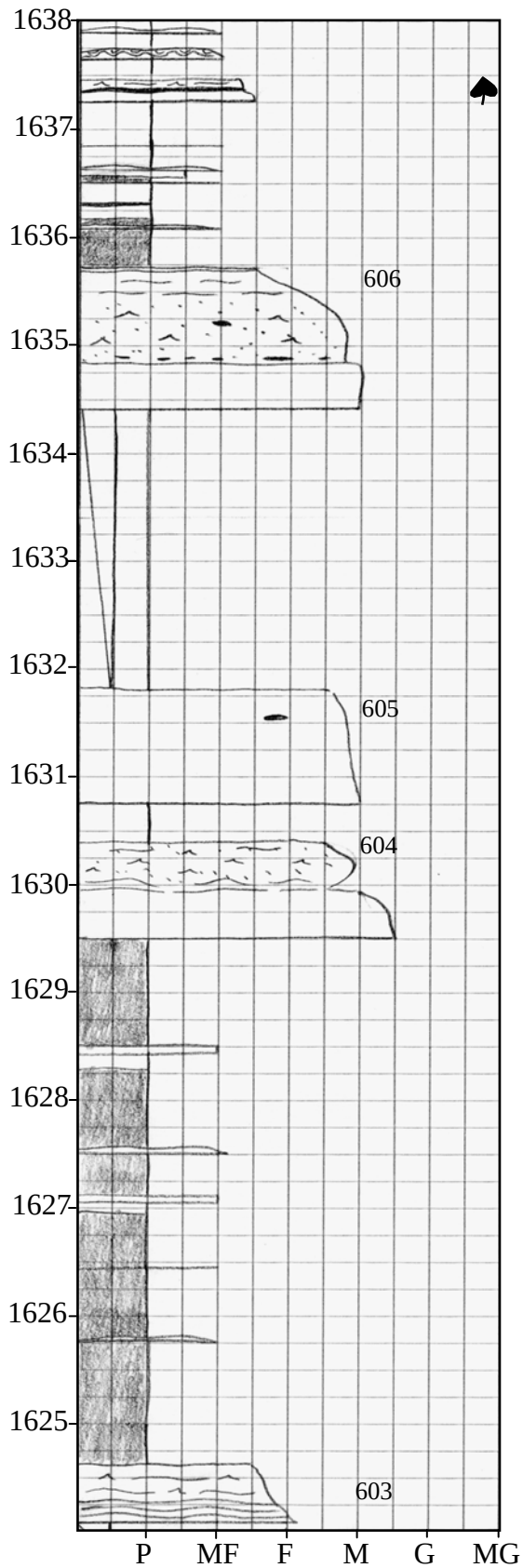
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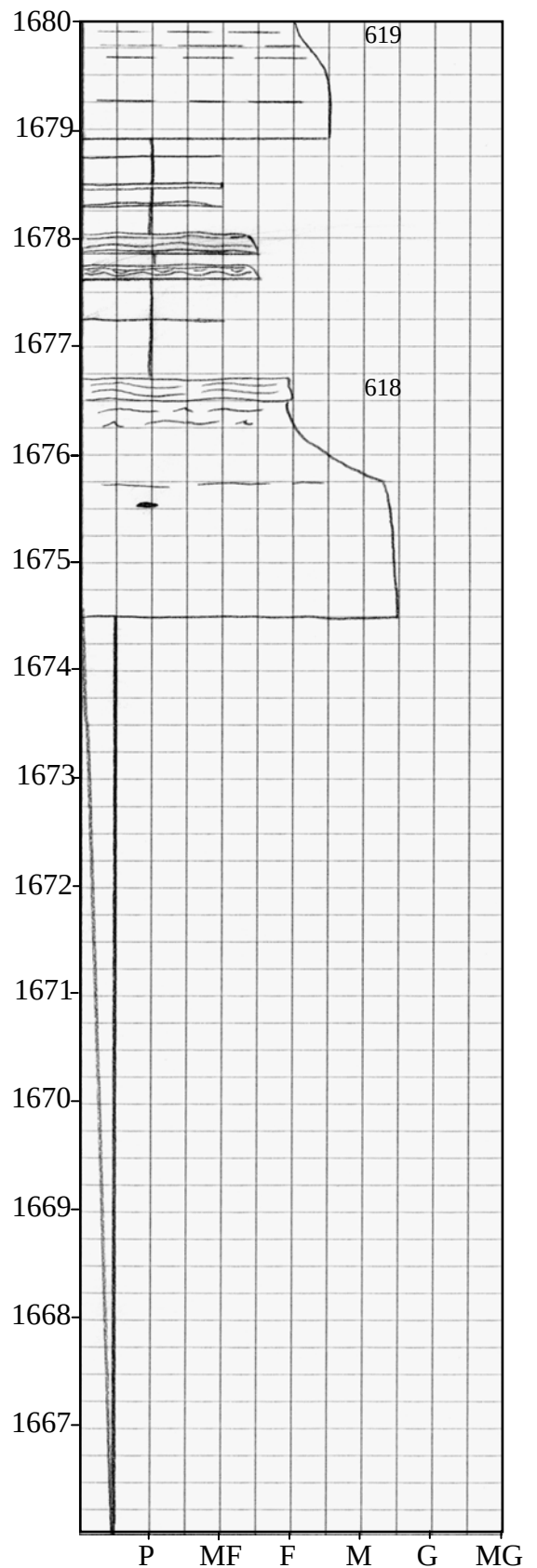
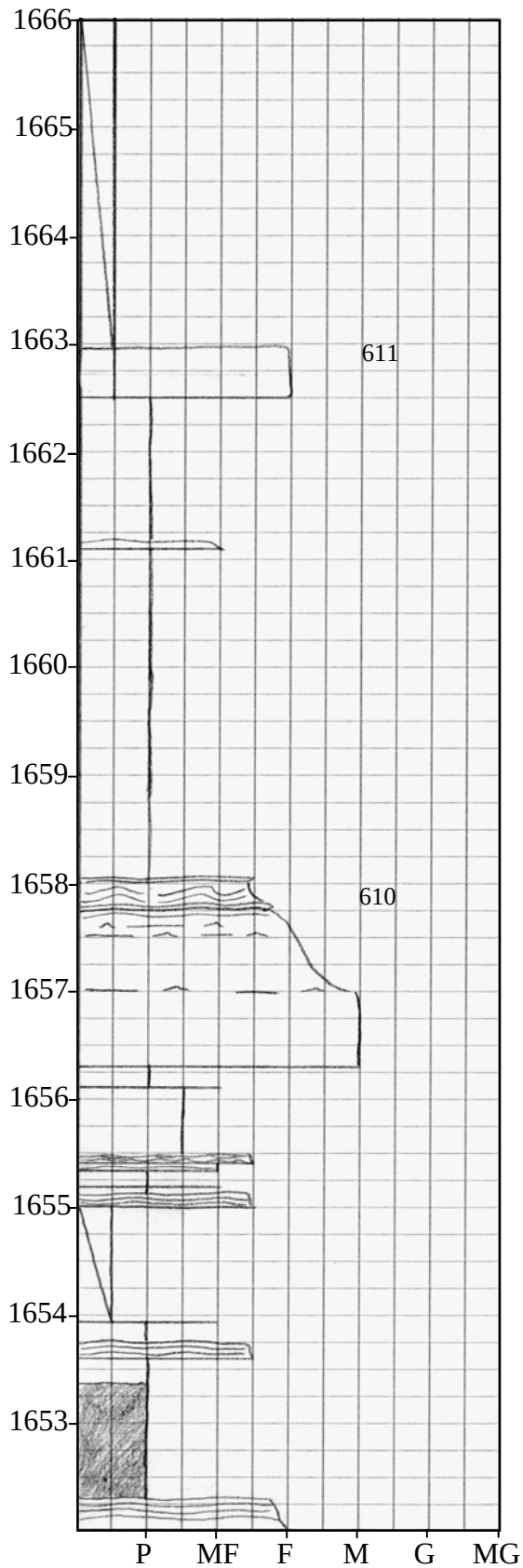
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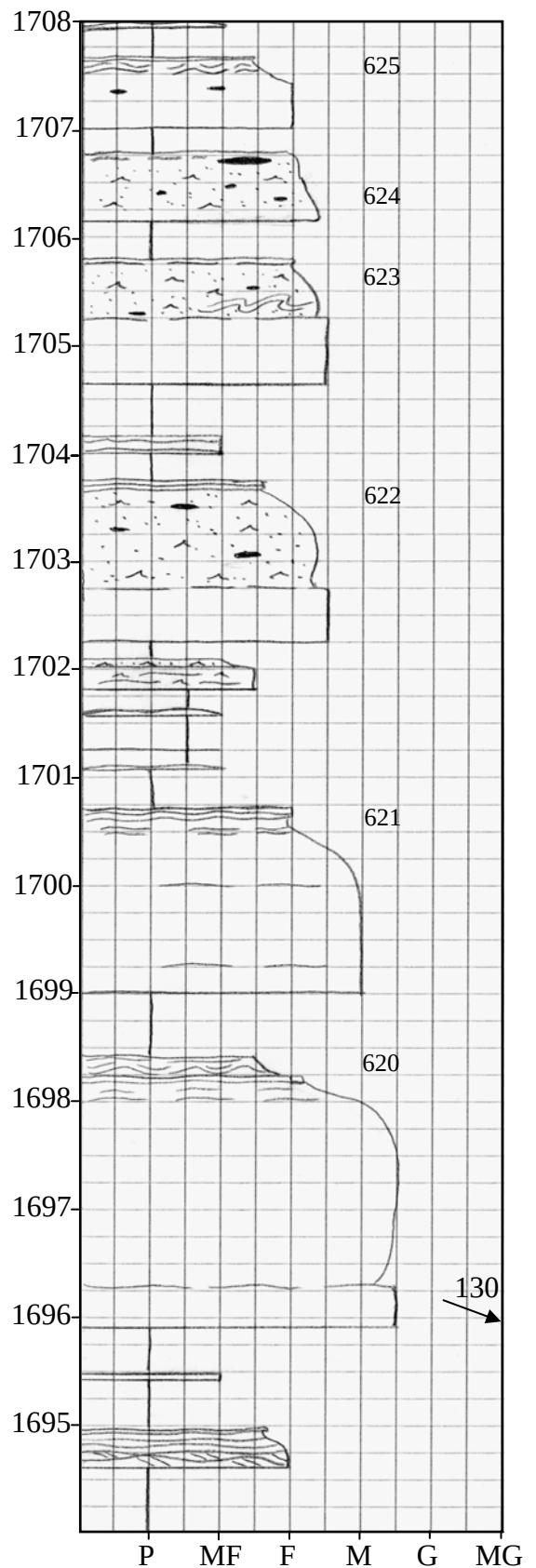
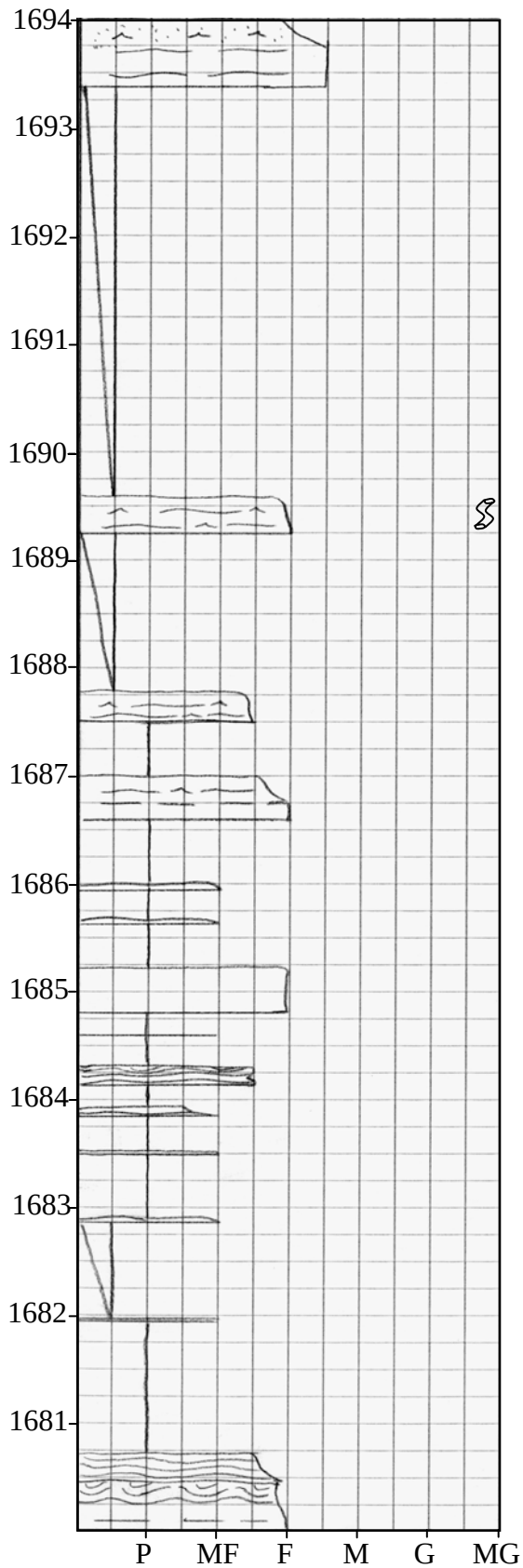
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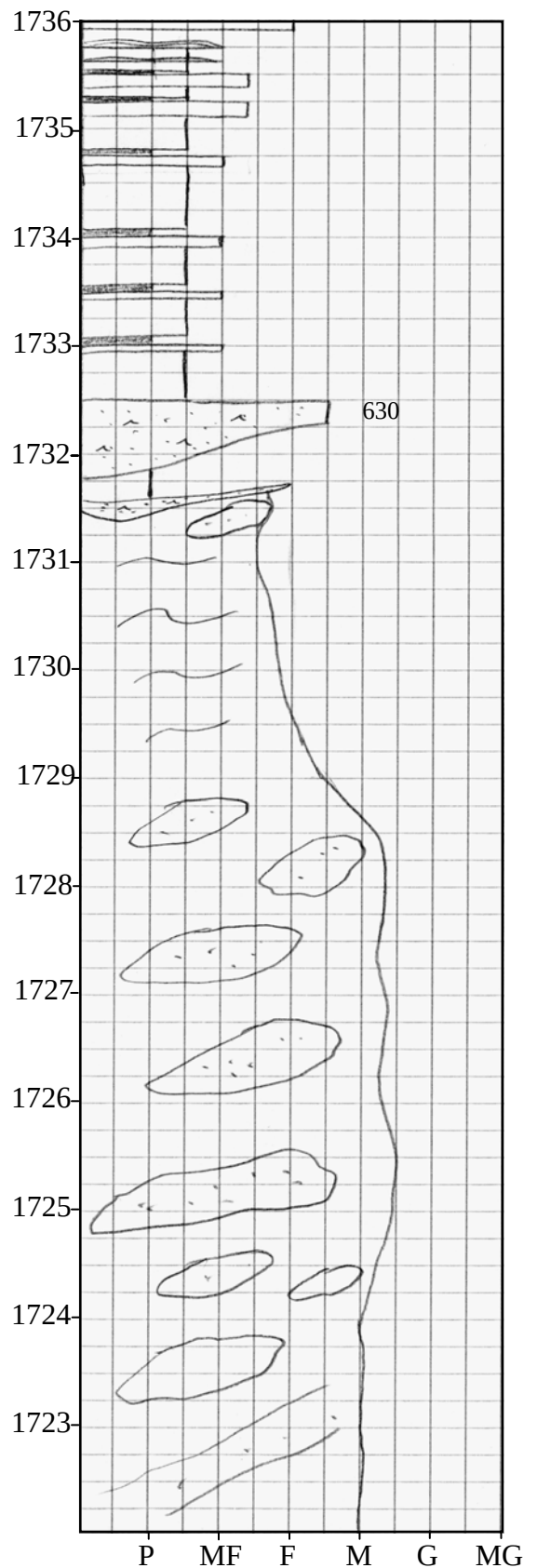
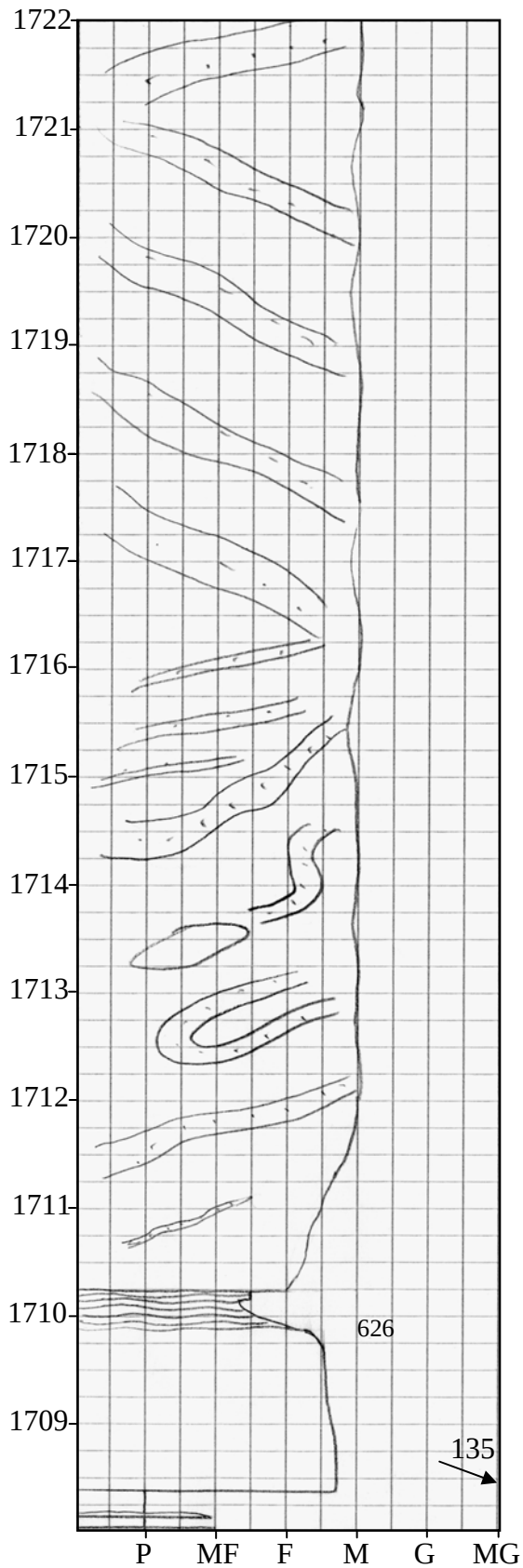
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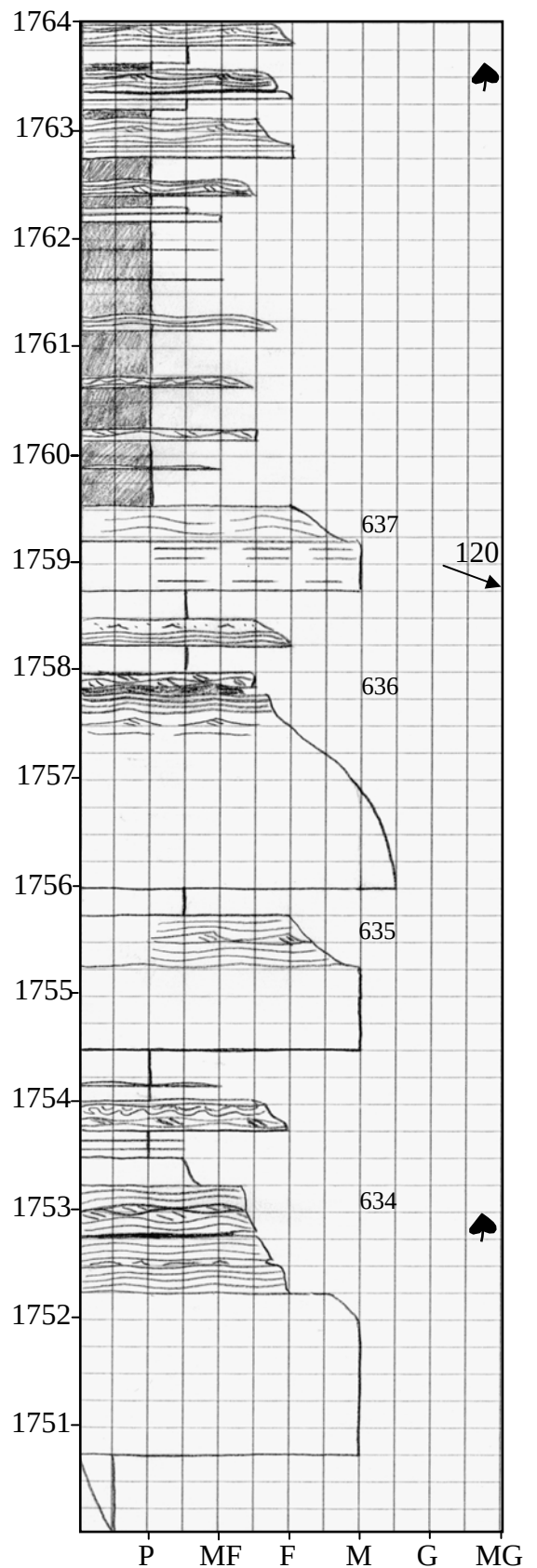
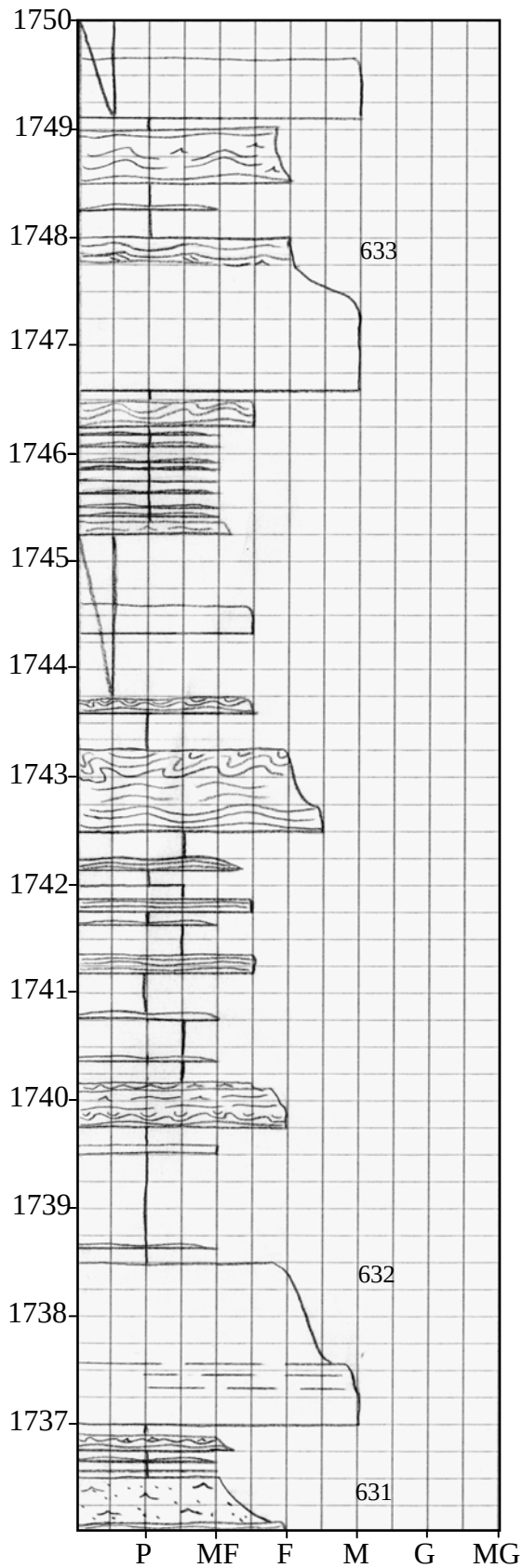
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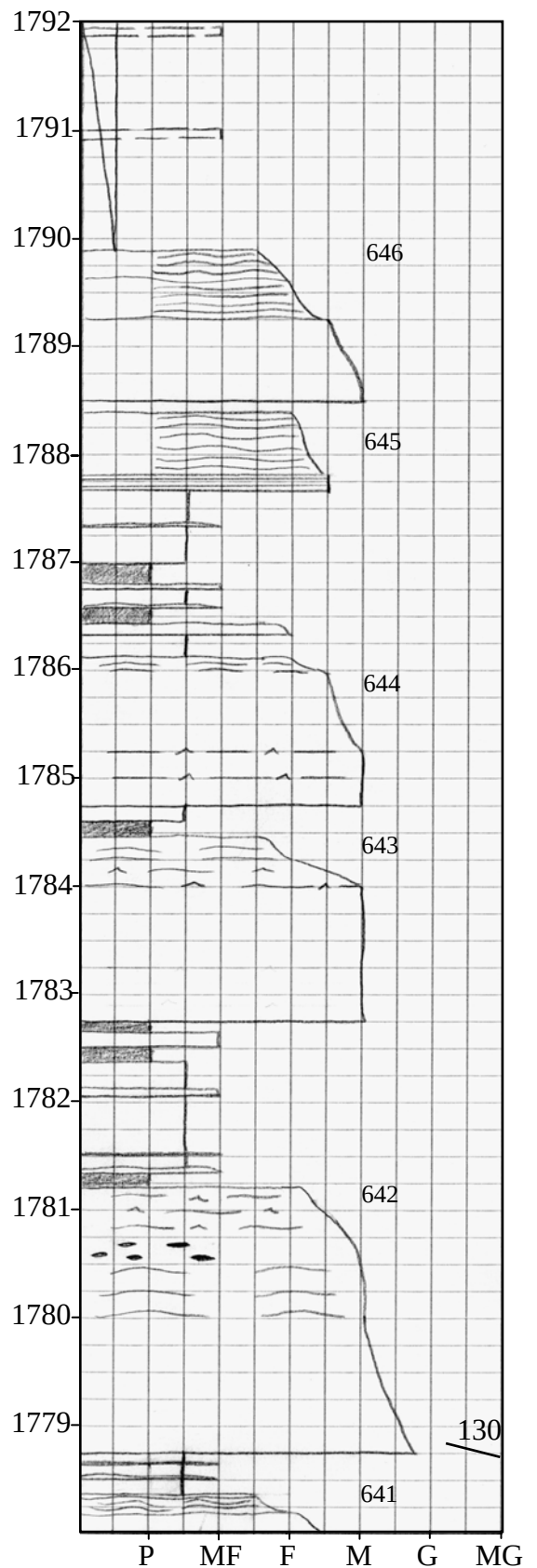
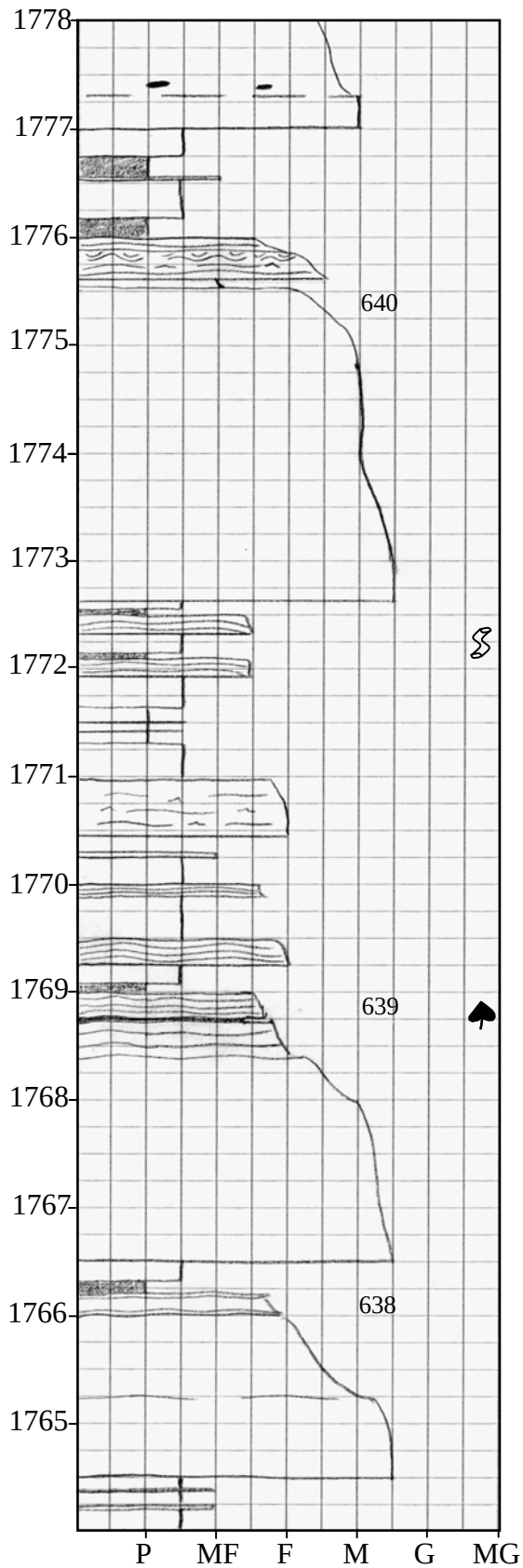
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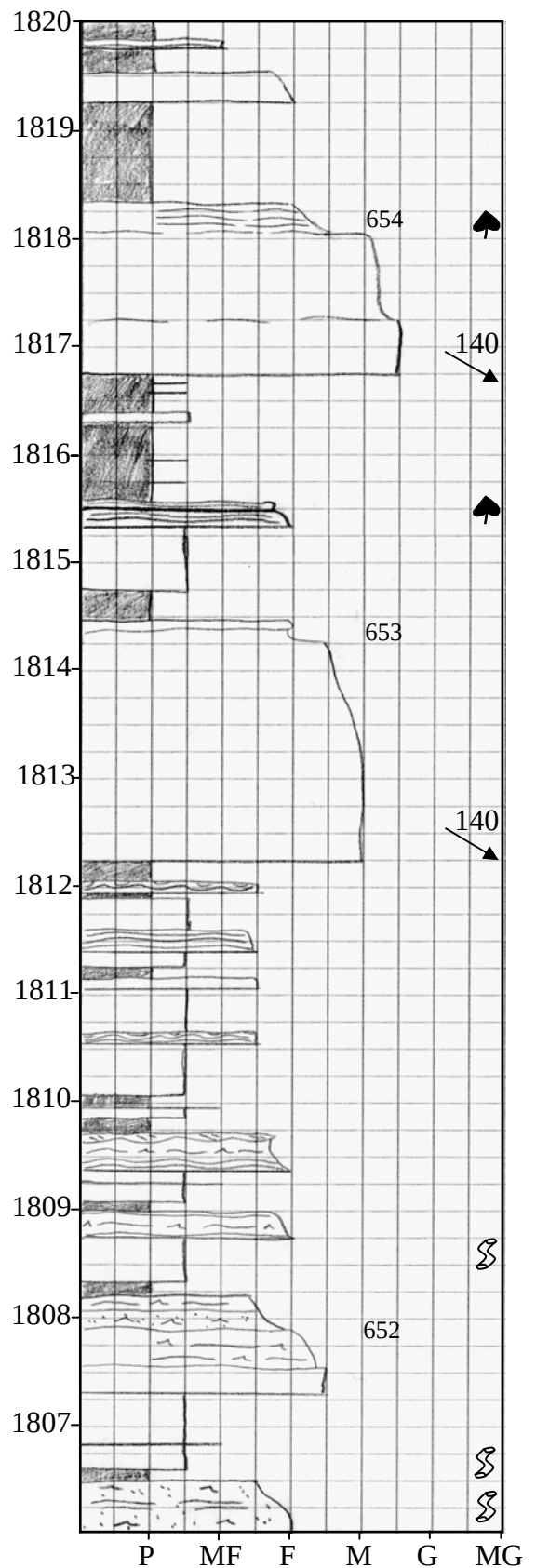
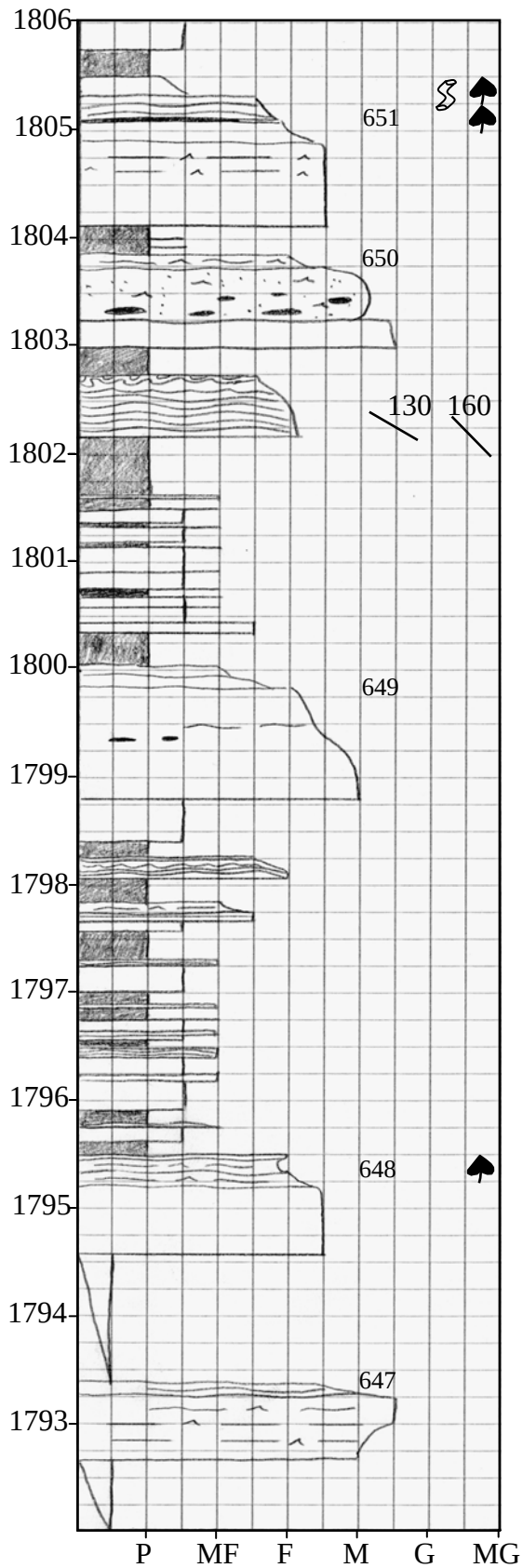
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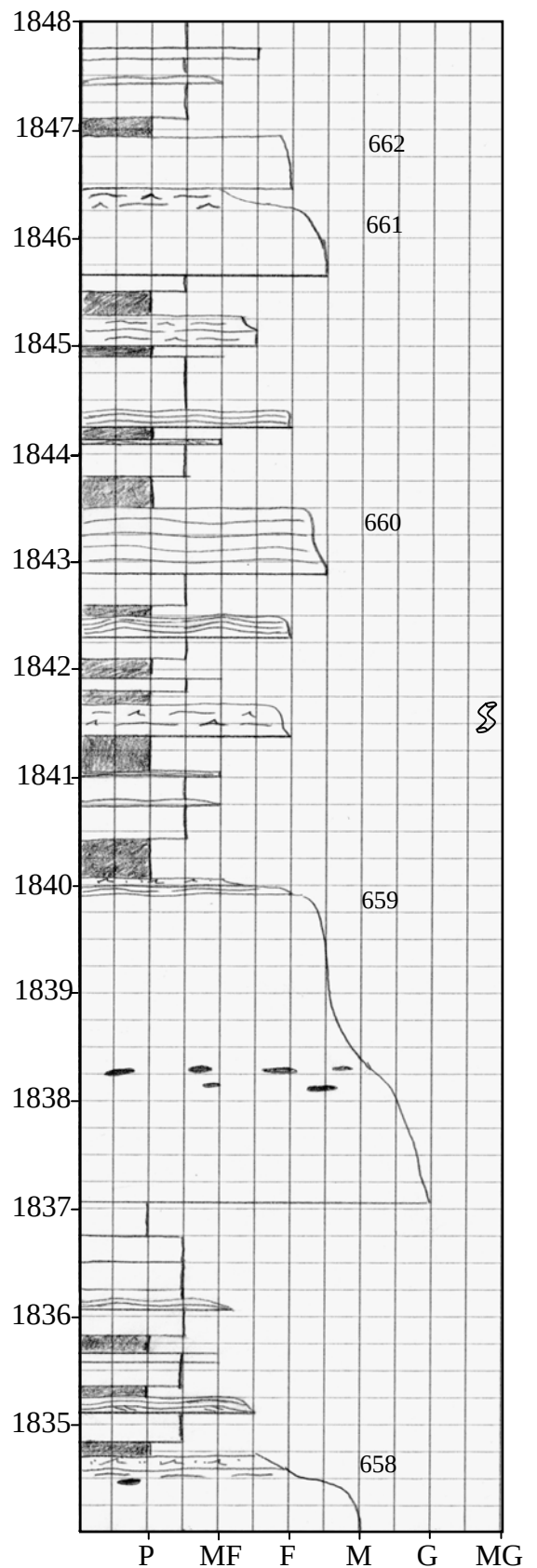
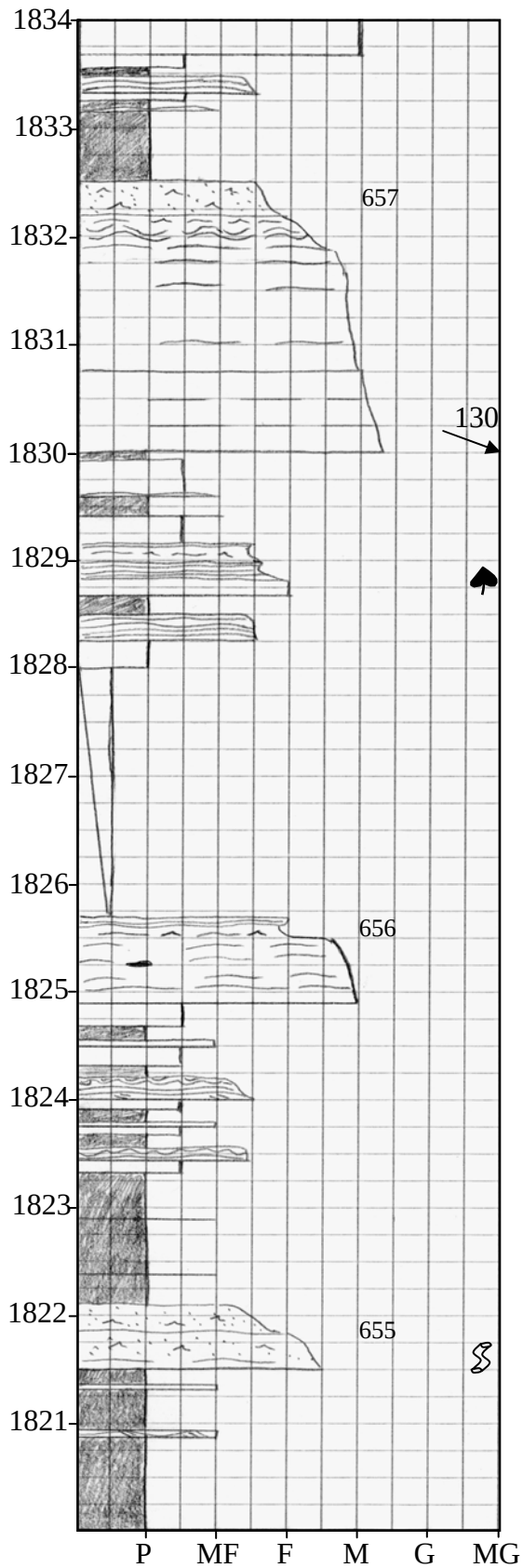
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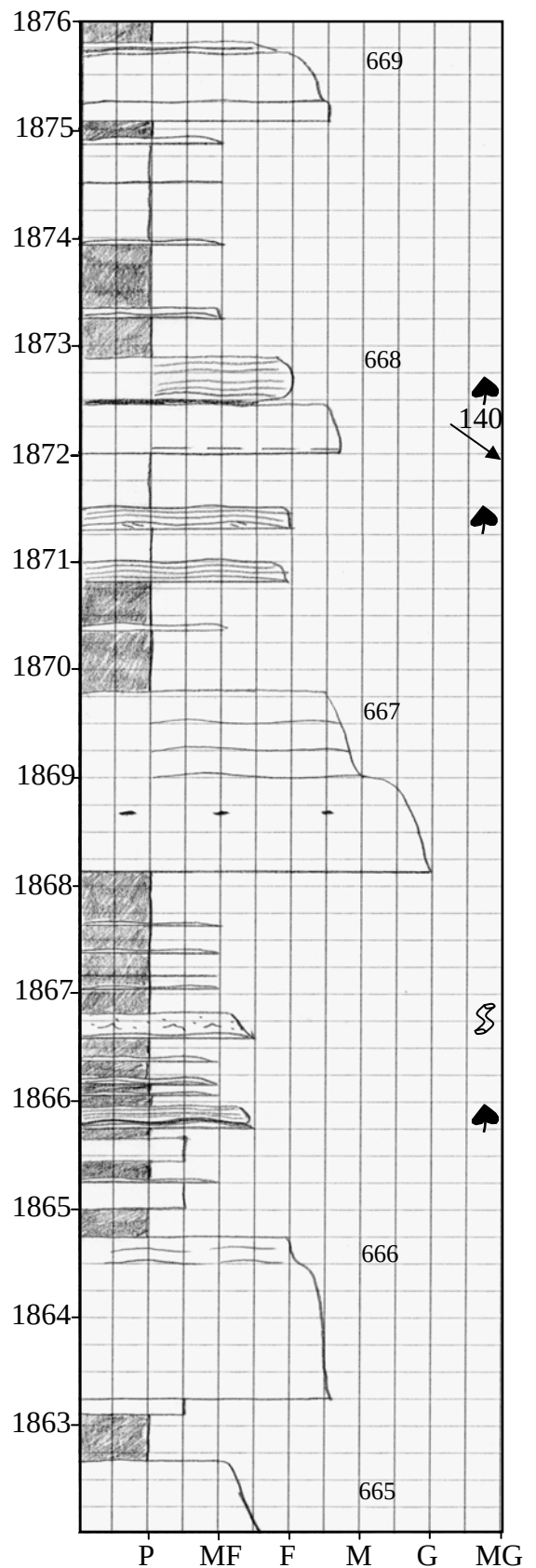
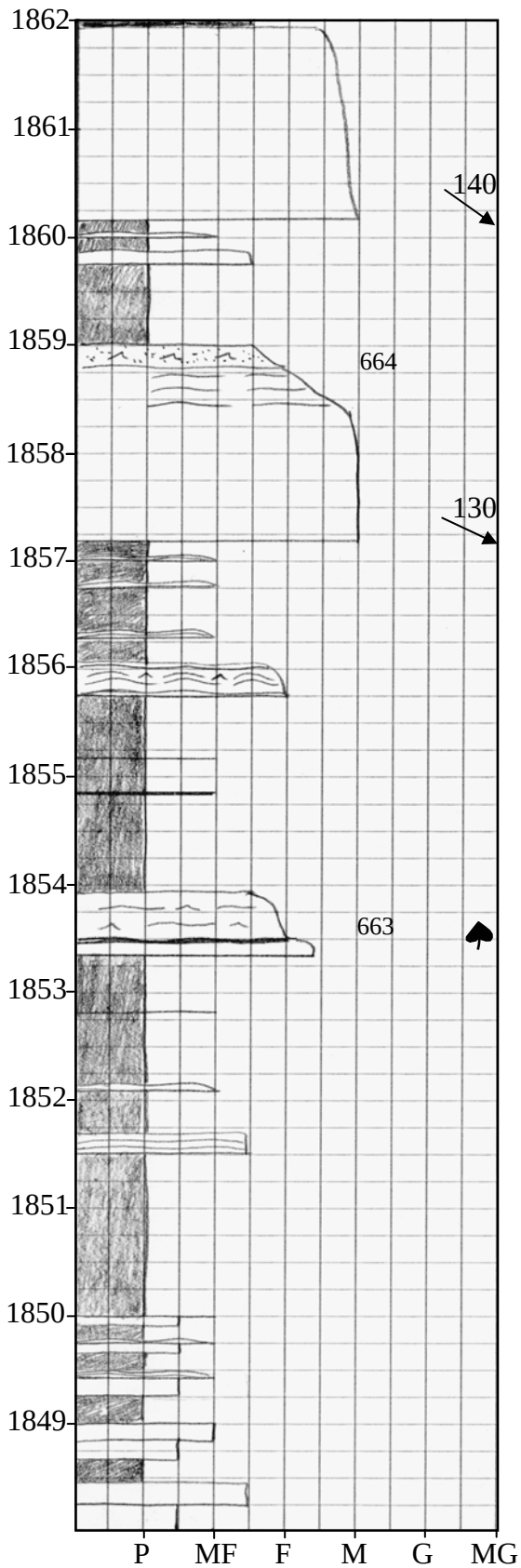
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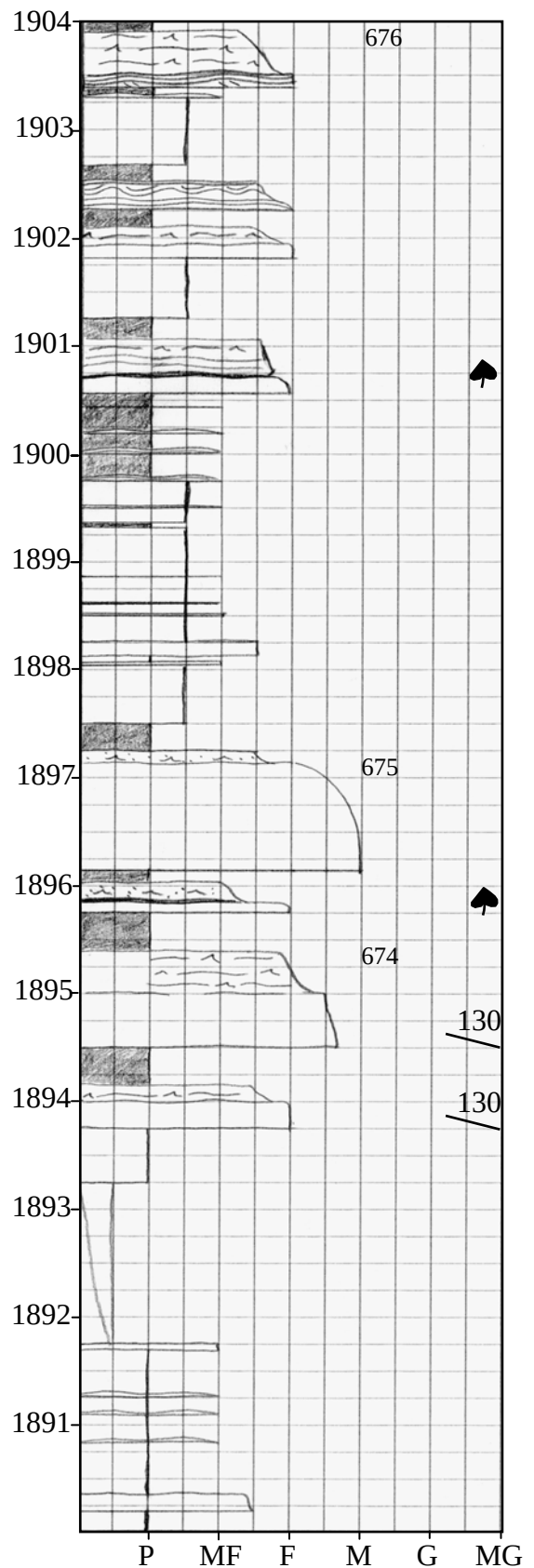
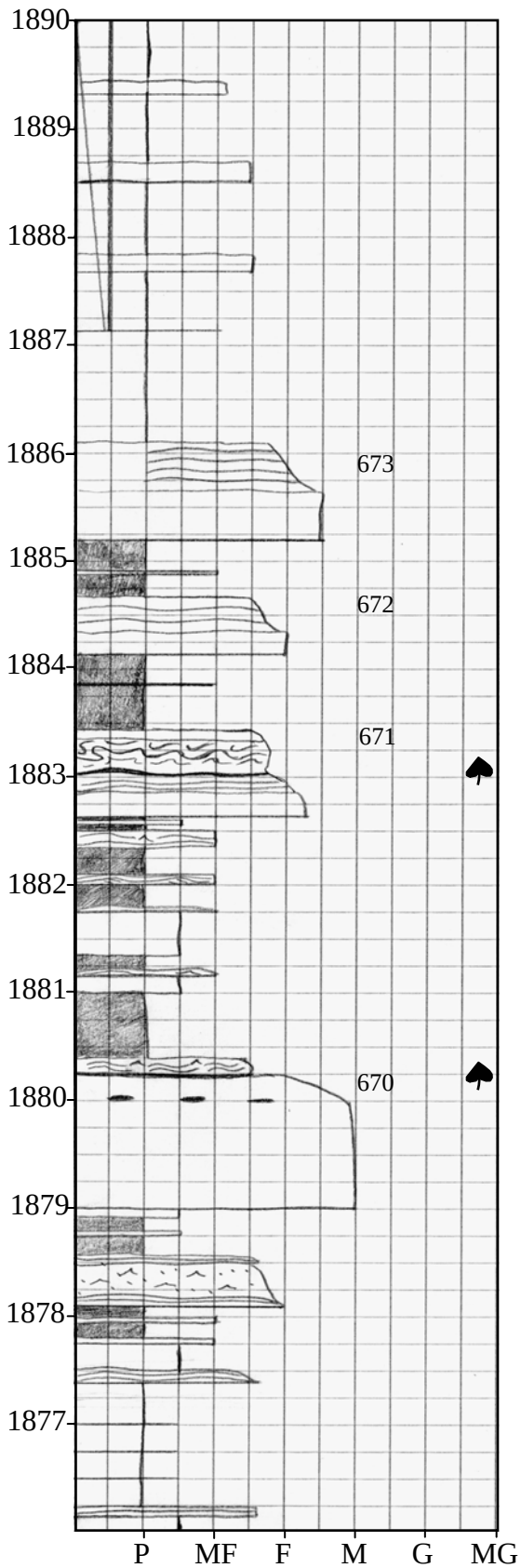
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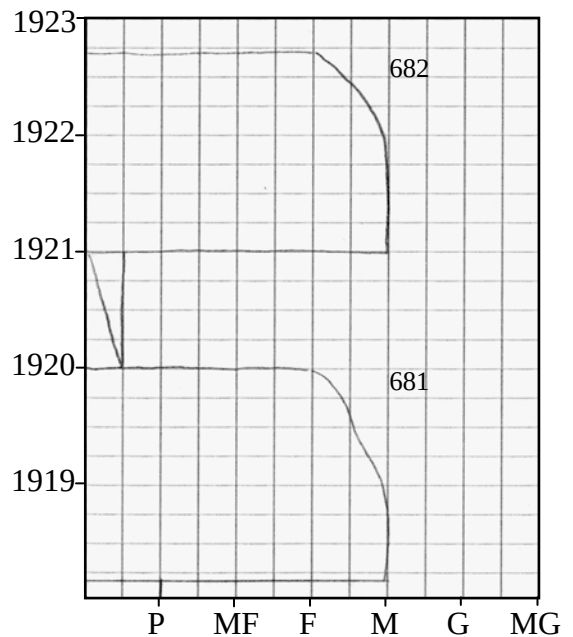
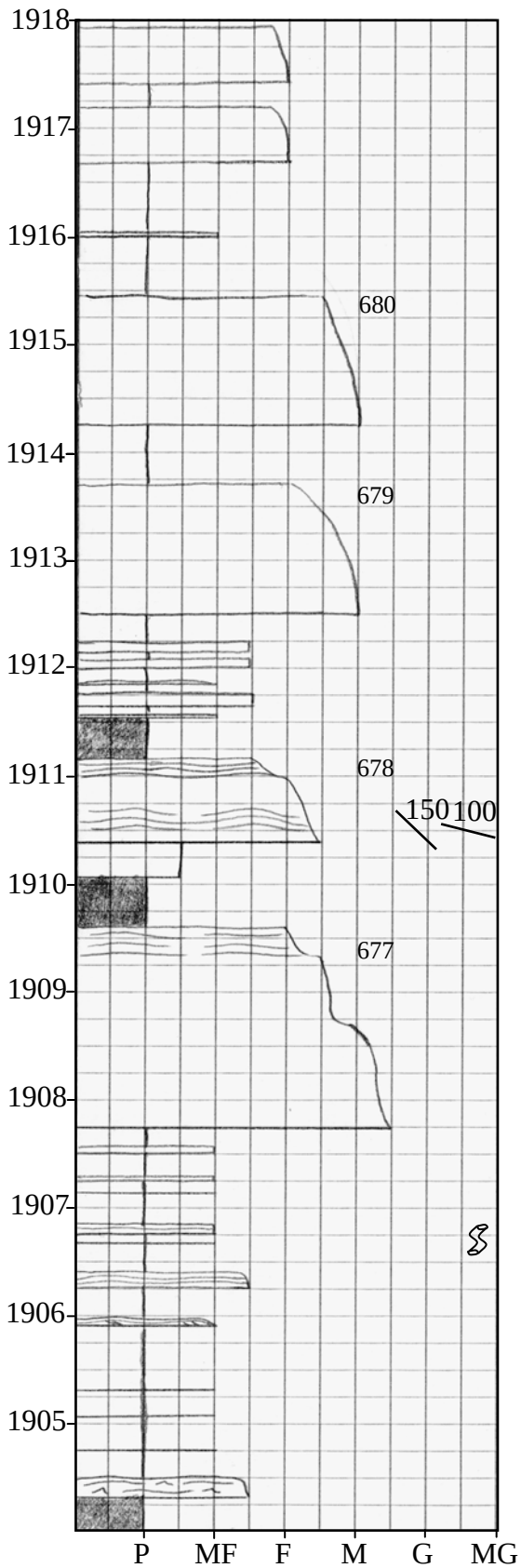
Sezione B



Sezione B



Sezione B



Sezione C

La sezione C, con 786 m di spessore, è ubicata lungo la Valle del Lamone fra le località di Fantino e Valbura, a circa 5 Km a sud-ovest del paese di Marradi. La porzione basale di questa sezione è stata misurata lungo il Fiume Lamone, che comprende un'intervallo che parte da circa 50m al di sopra il Caotico di Acquadalto fino allo strato 293. Di questa parte basale spessa 323 m soltanto l'intervallo fra il Contessa e la Colombina 4 è stato misurato nei pressi della località di Campigno (strada a sinistra di Biforco, Fig. 5). A partire dallo strato 293 sono stati misurati circa 50 m lungo la strada sterrata che va verso la località di Lozzole. La parte superiore della successione, invece, che va dallo strato 319 fino allo strato 415 (Colombina 30-MT), è stata misurata, quasi interamente, lungo la strada SS302 anche se qualche volta, a causa della mancanza di affioramento, si è dovuto effettuare la misura lungo l'alveo del fiume Lamone.

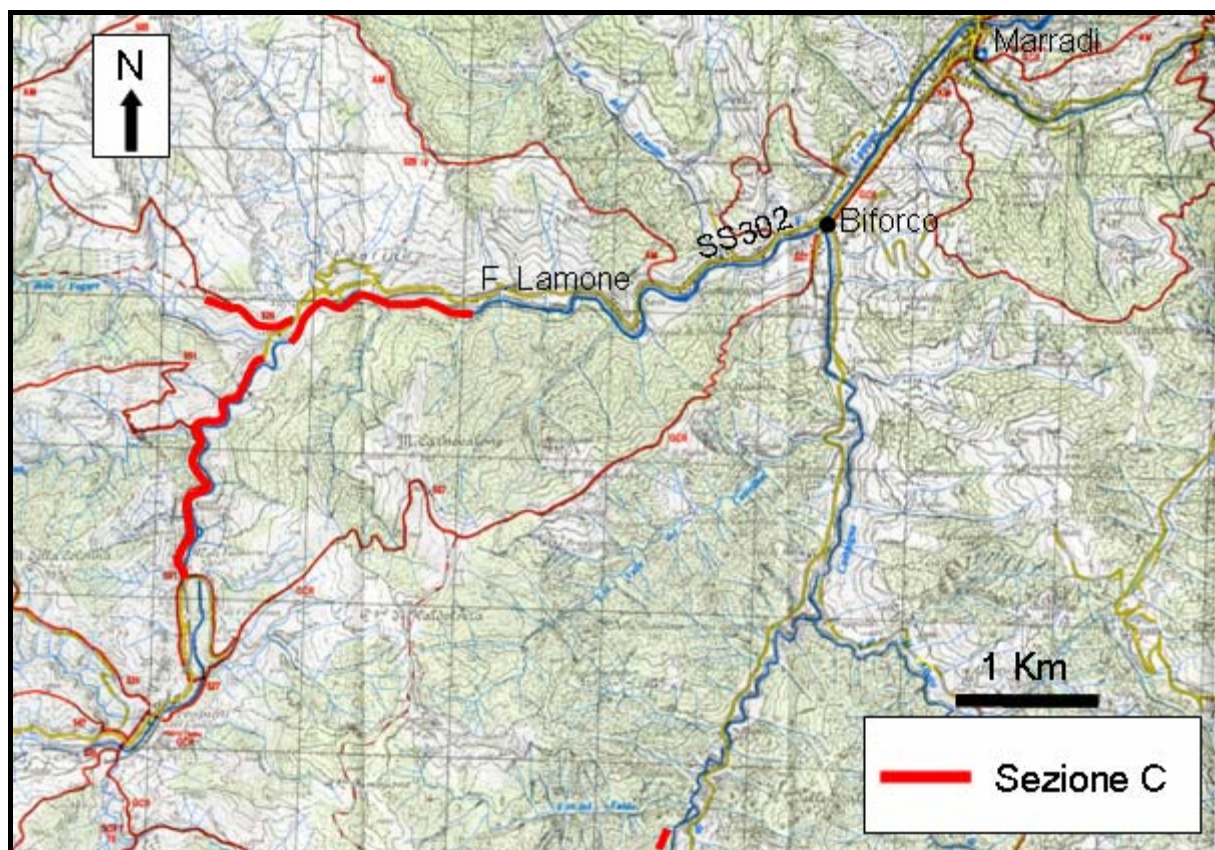
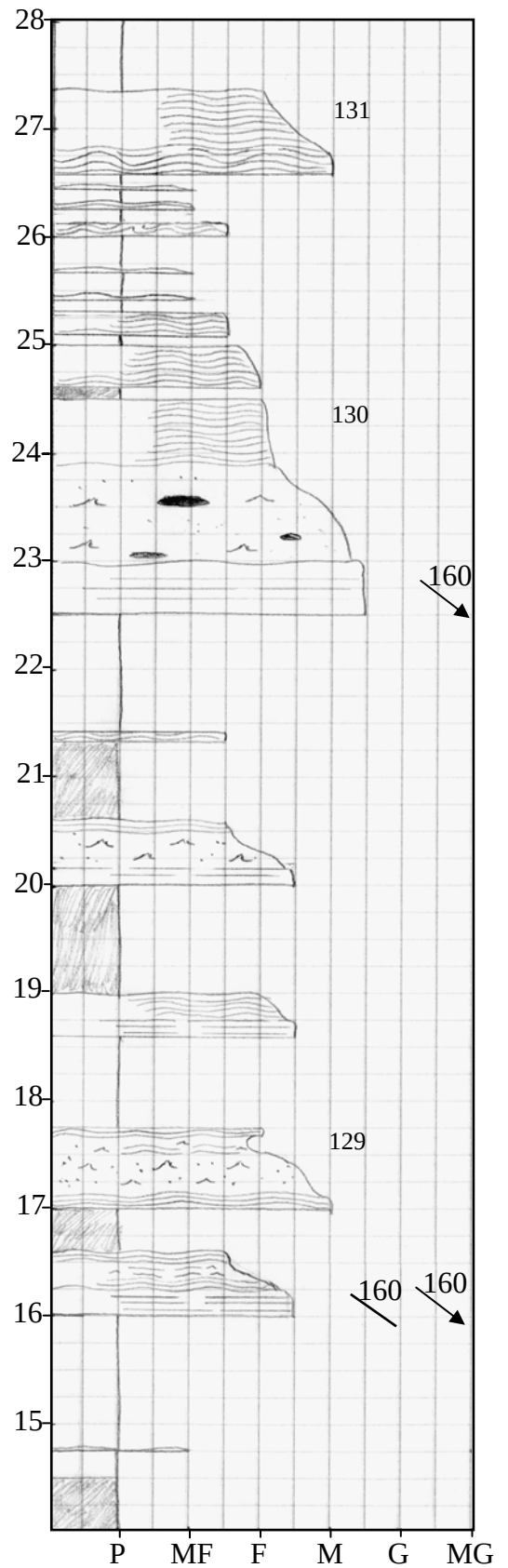
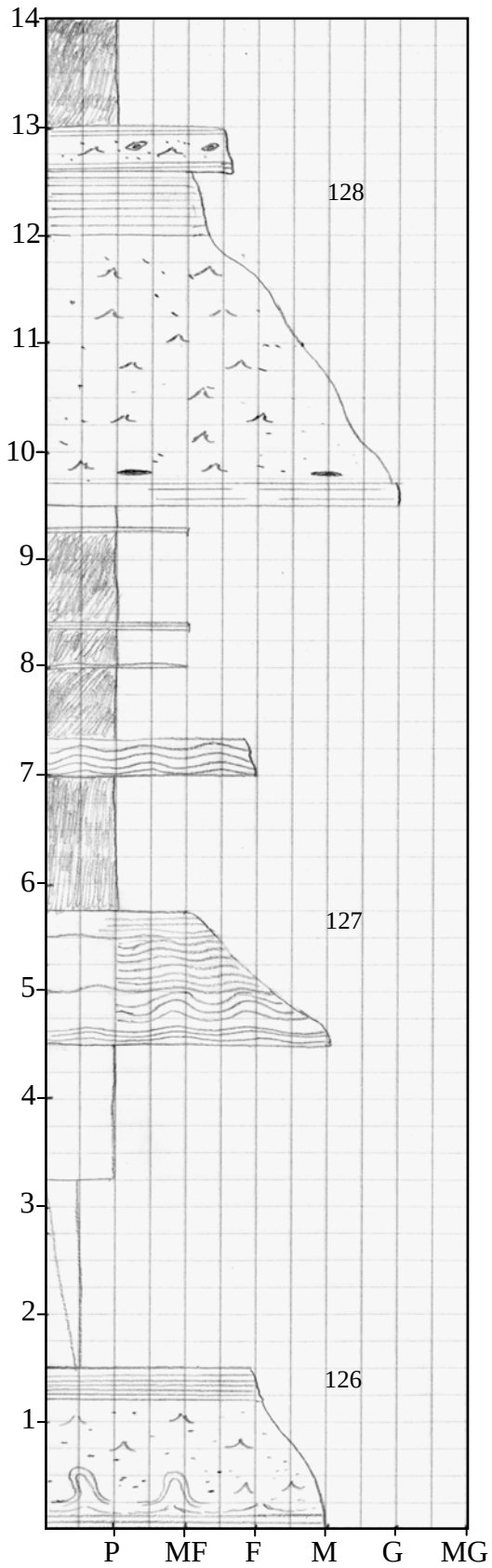
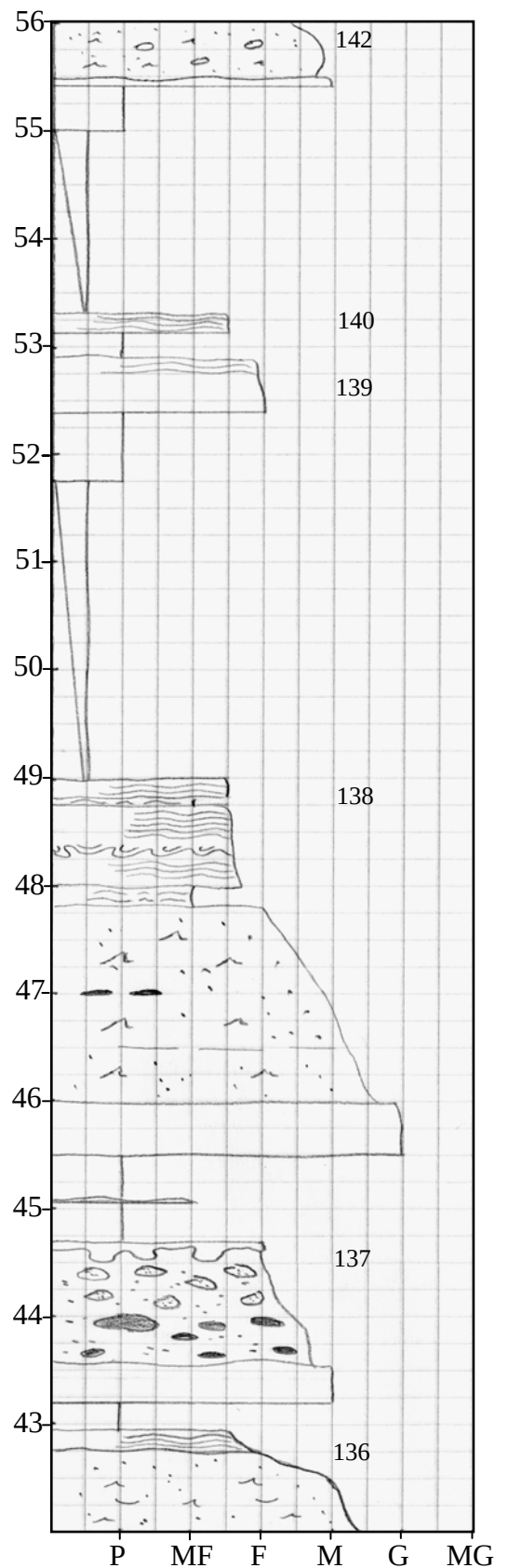
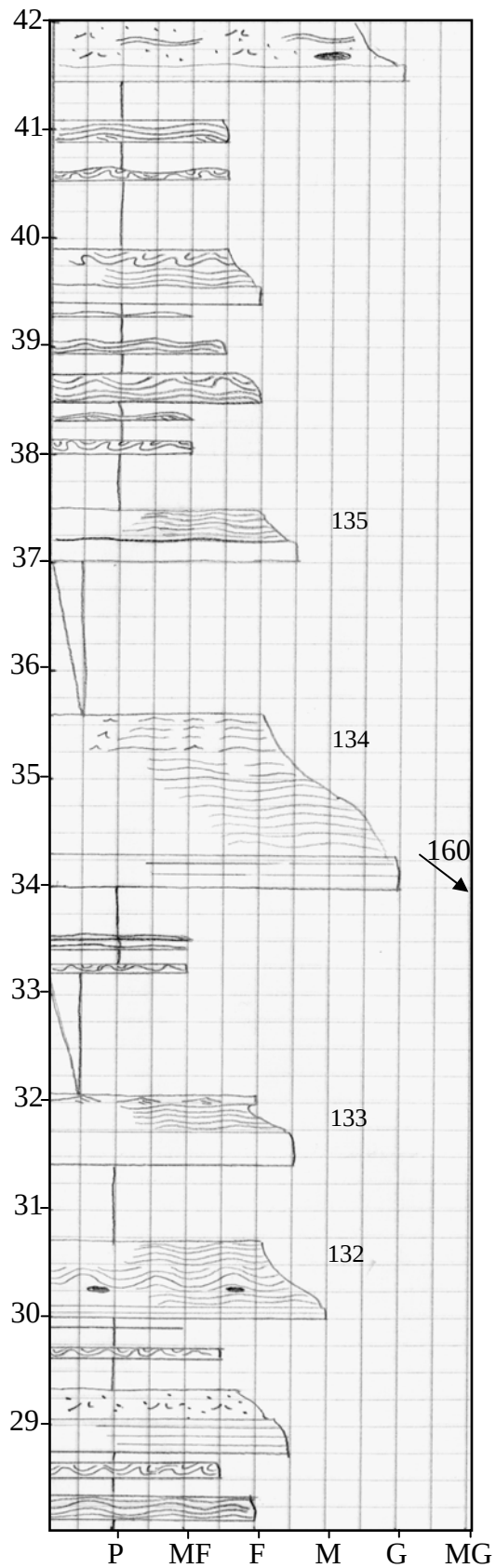


Figura 5- Mappa di localizzazione della sezione C, Valle del Lamone.

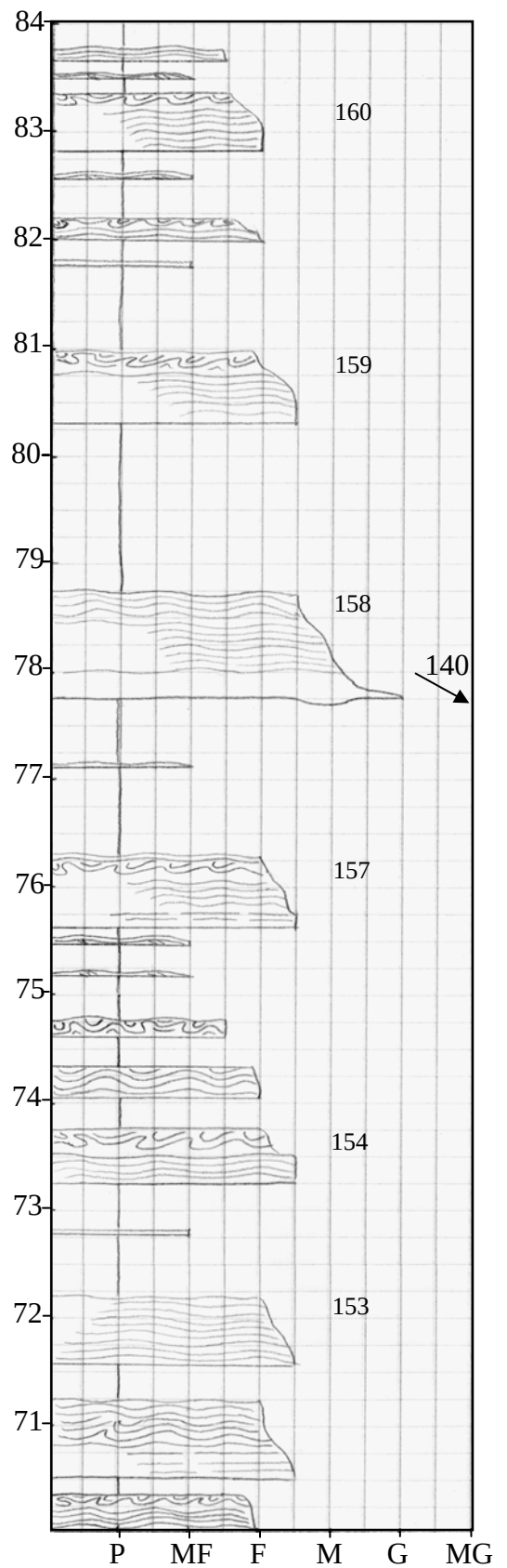
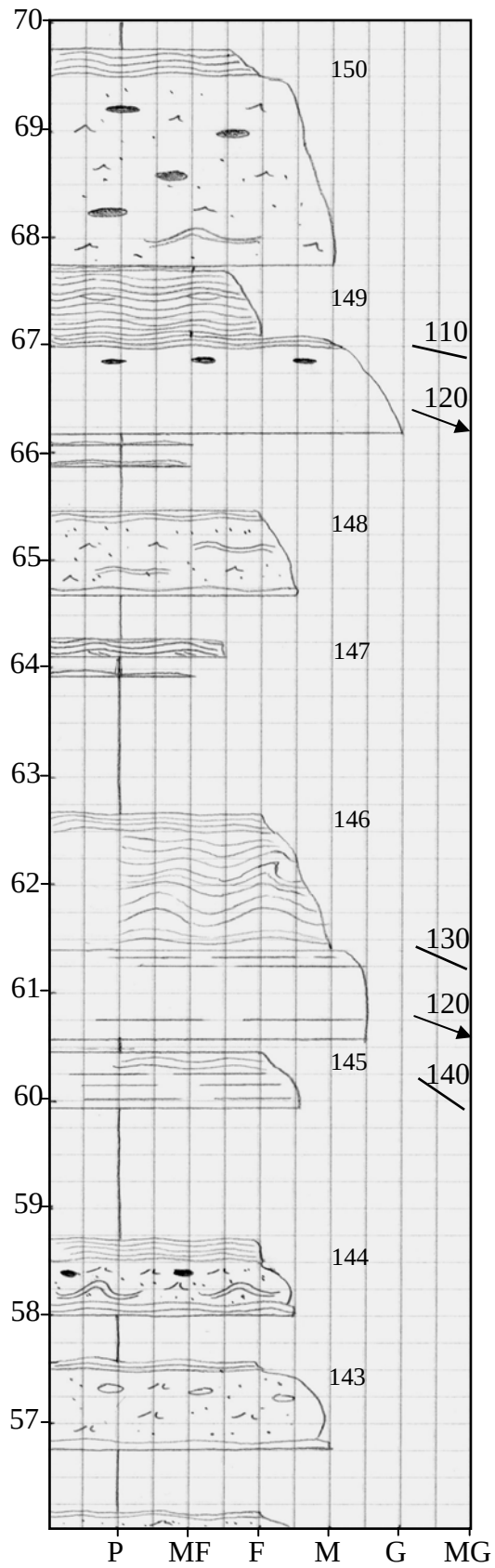
Sezione C



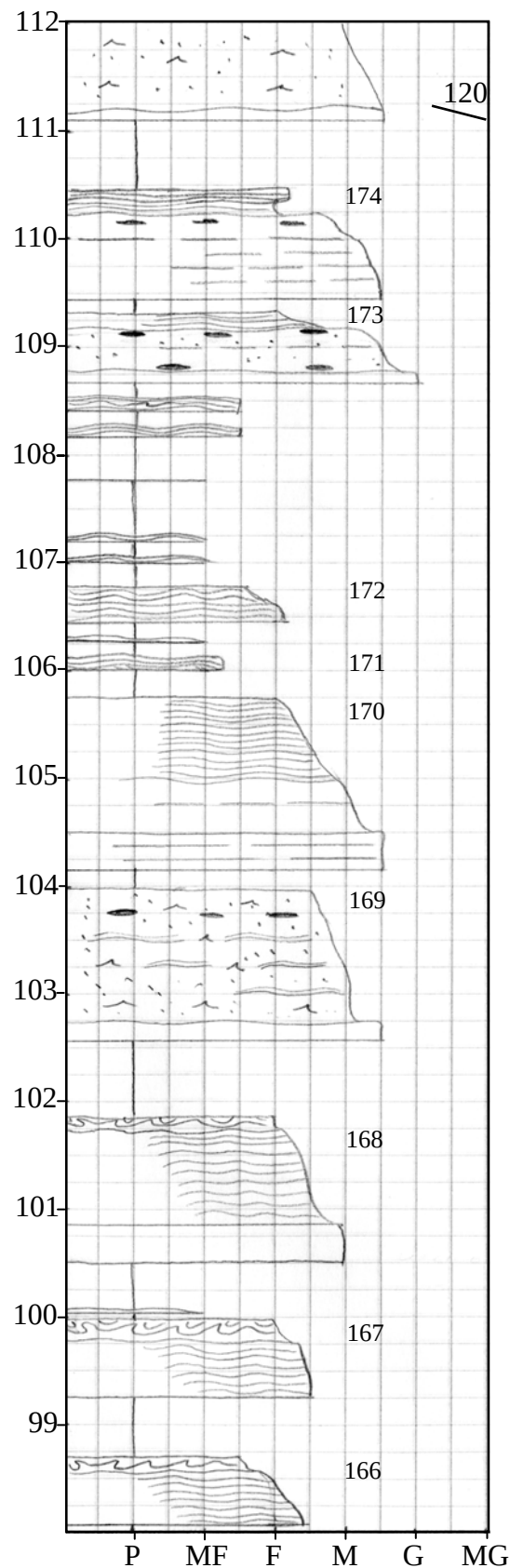
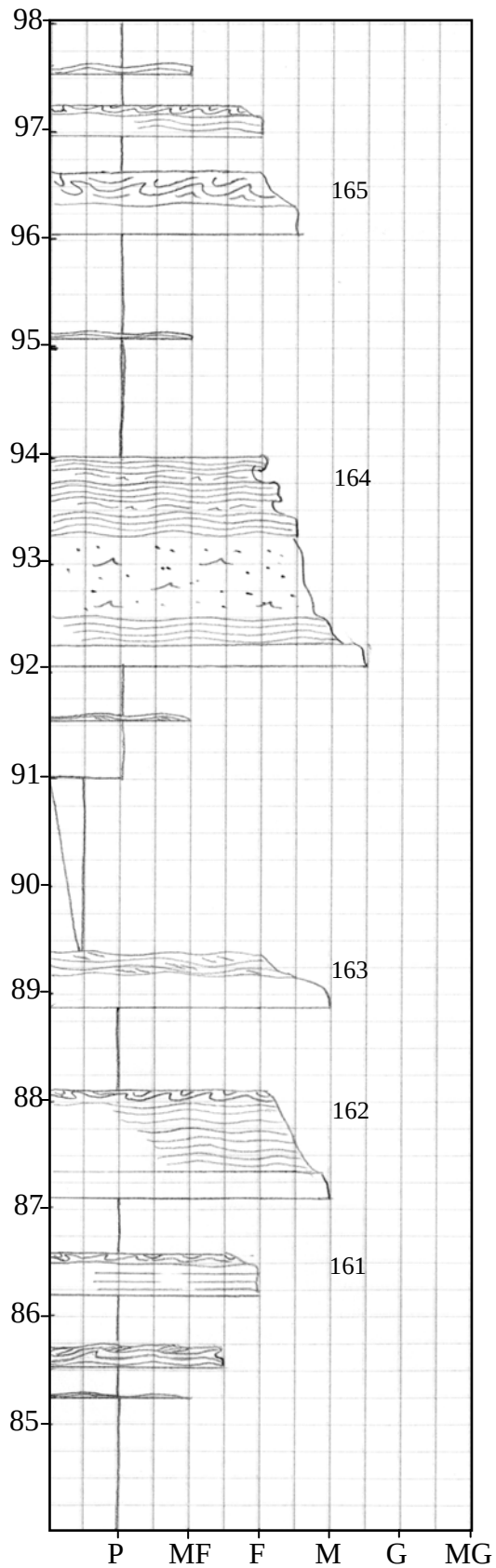
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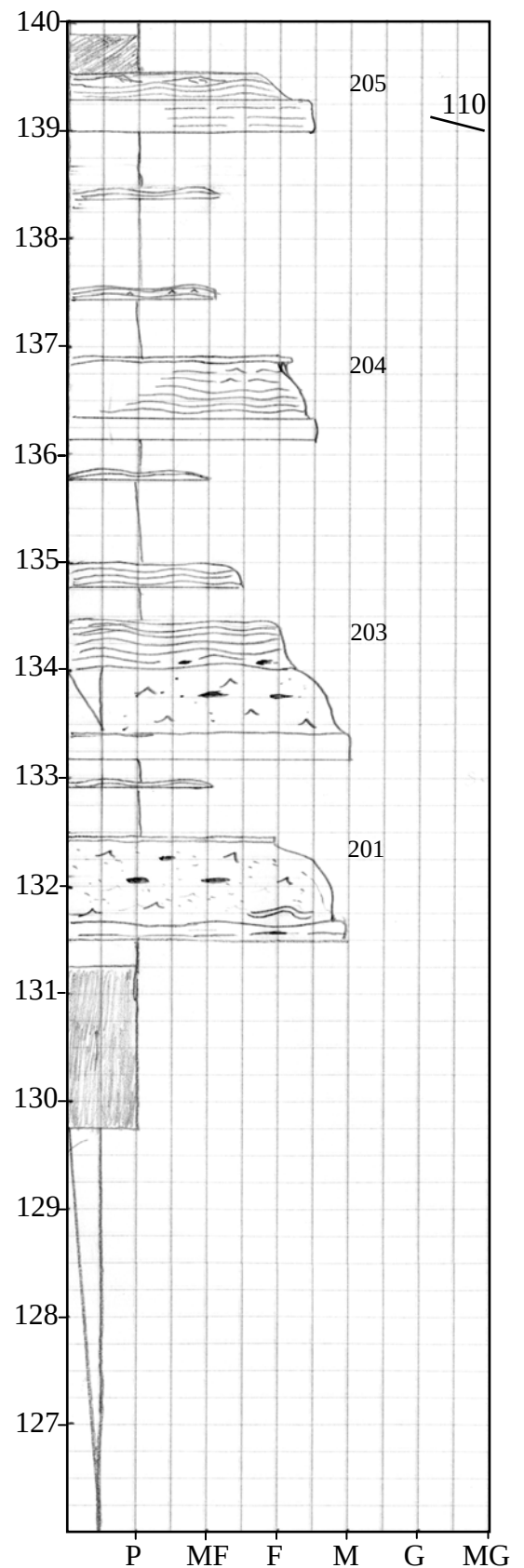
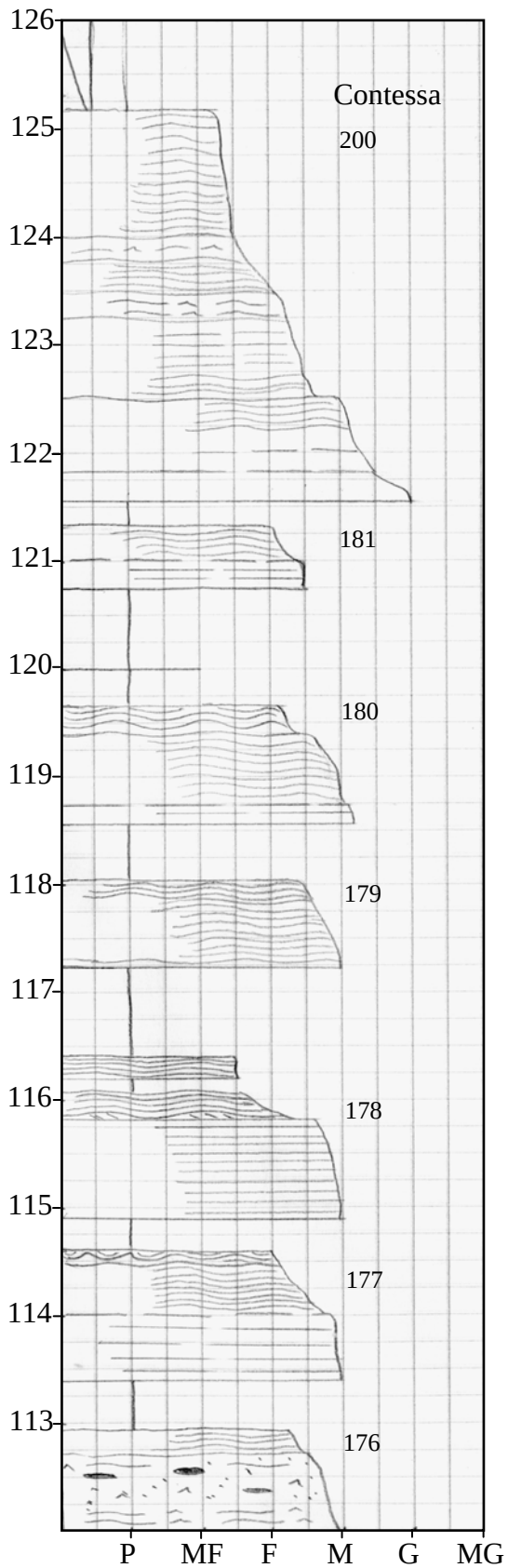
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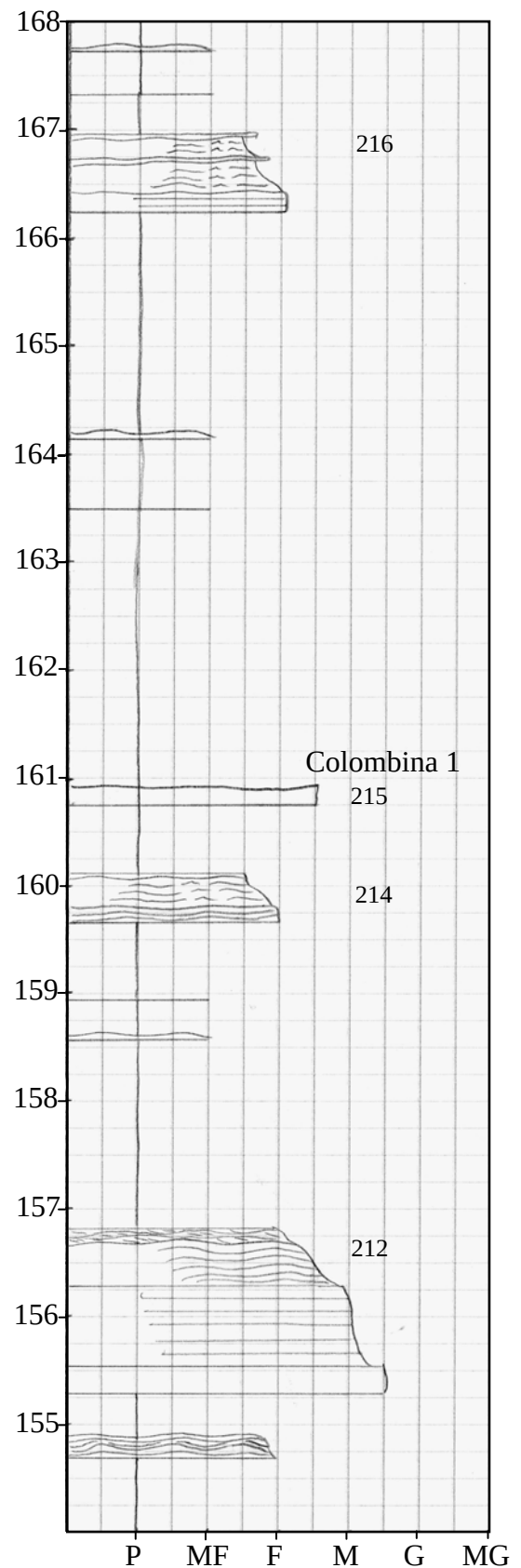
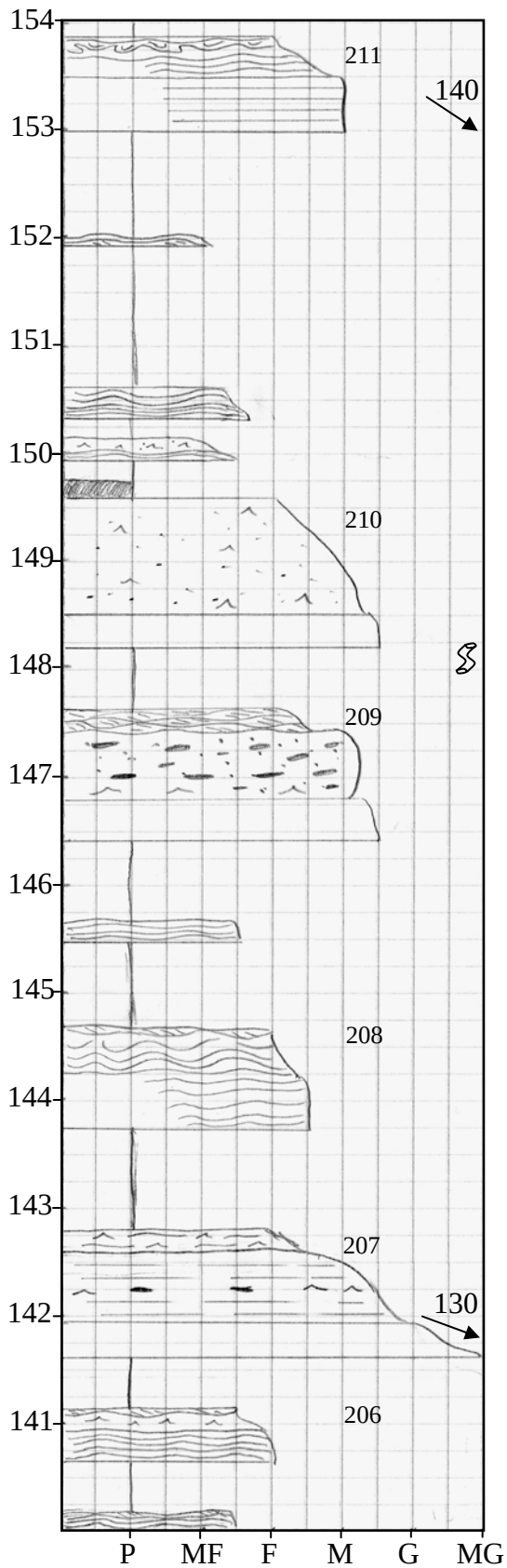
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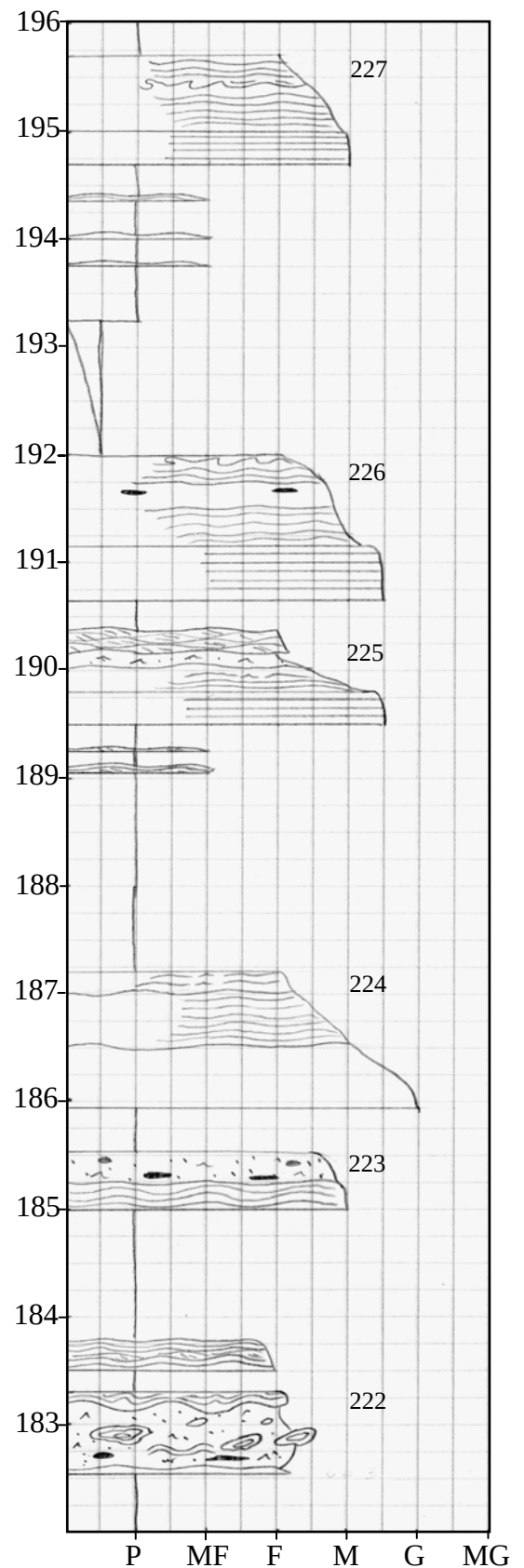
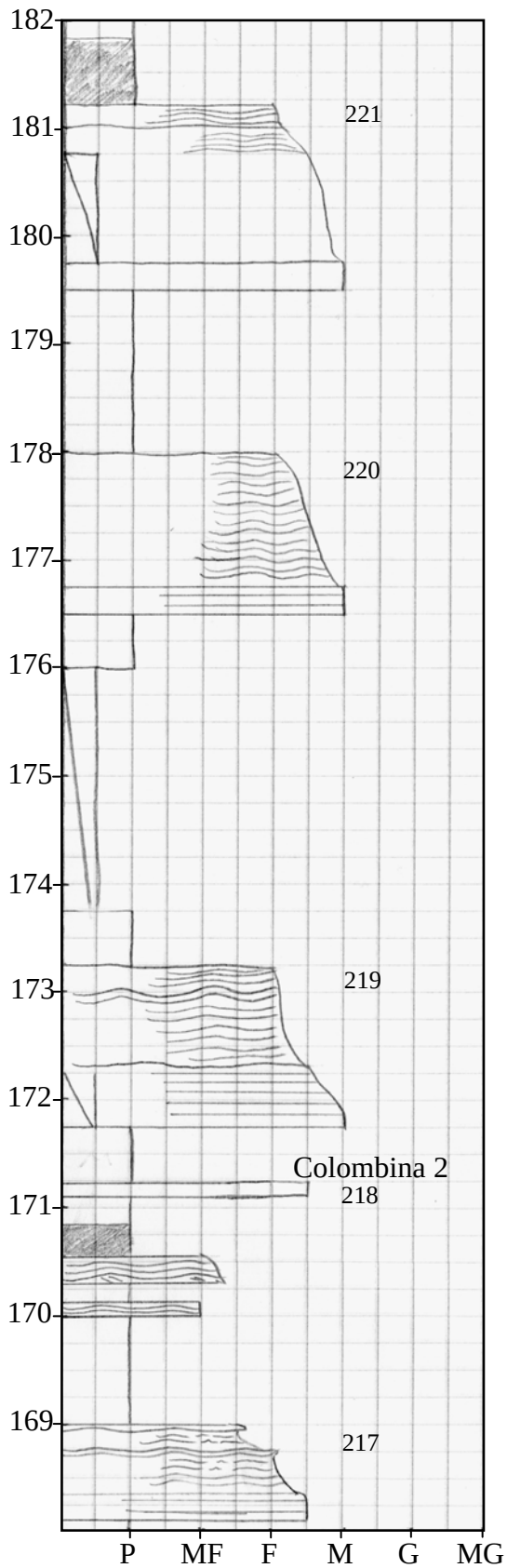
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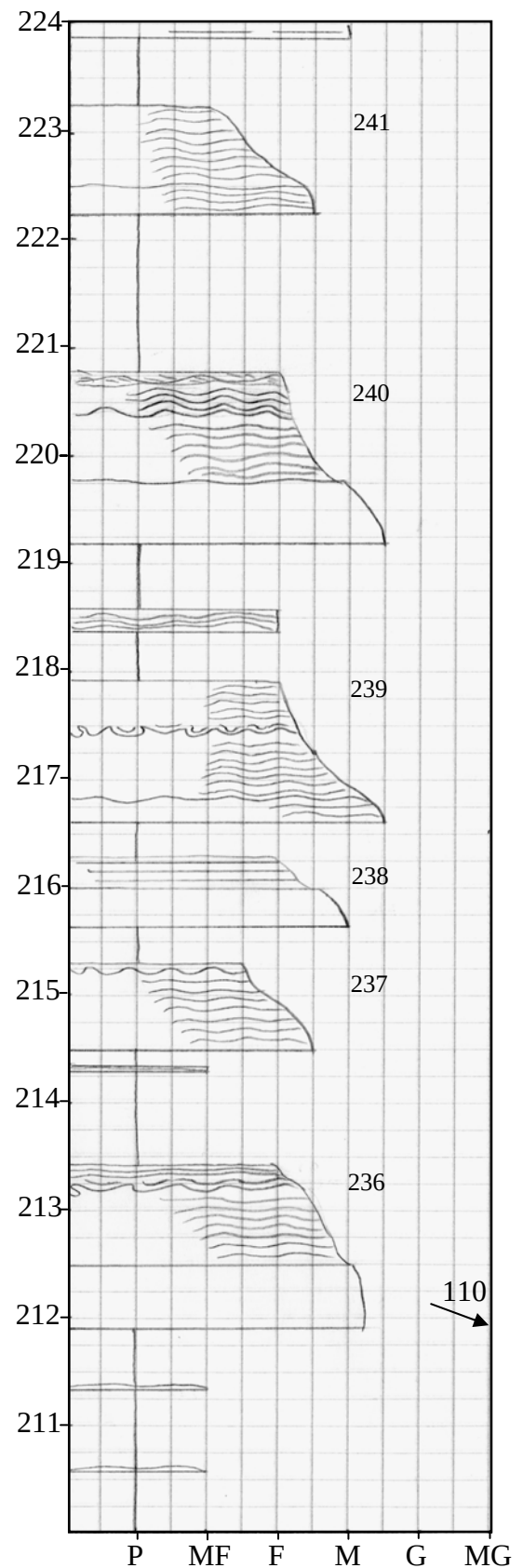
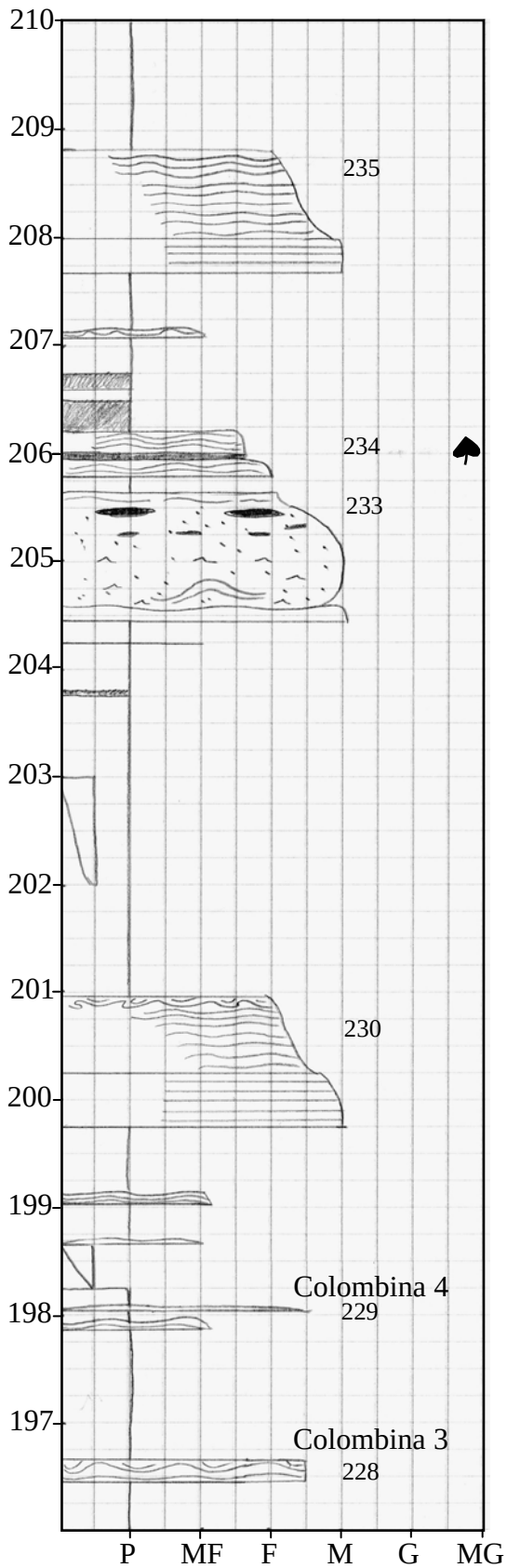
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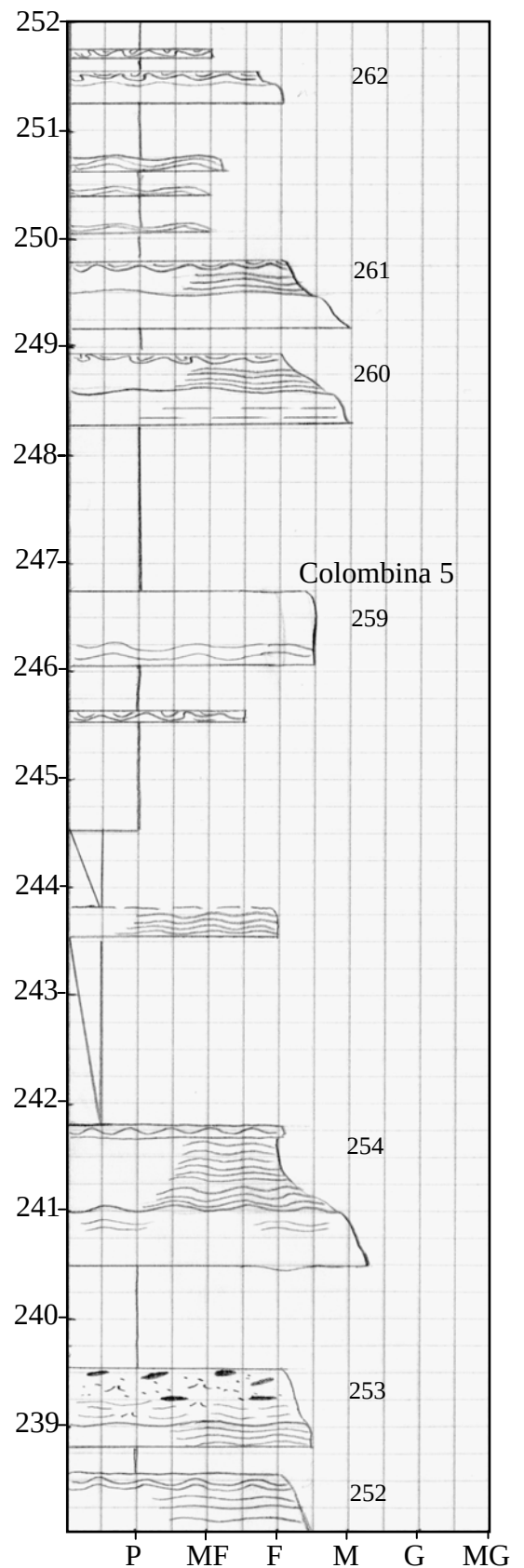
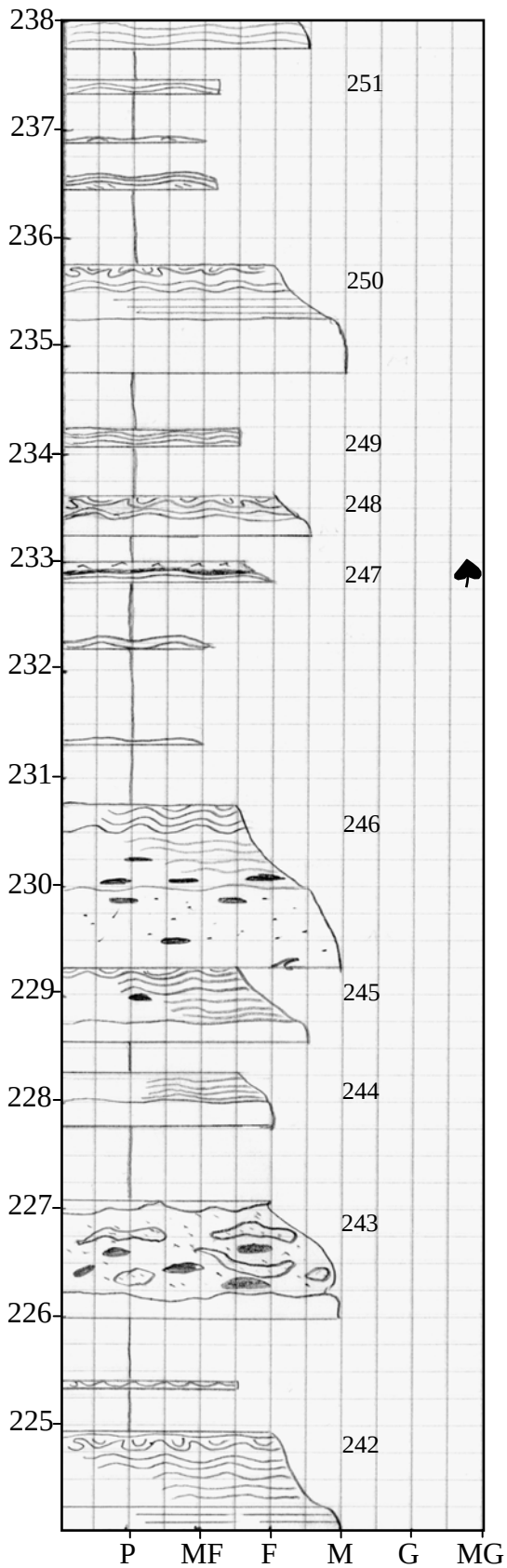
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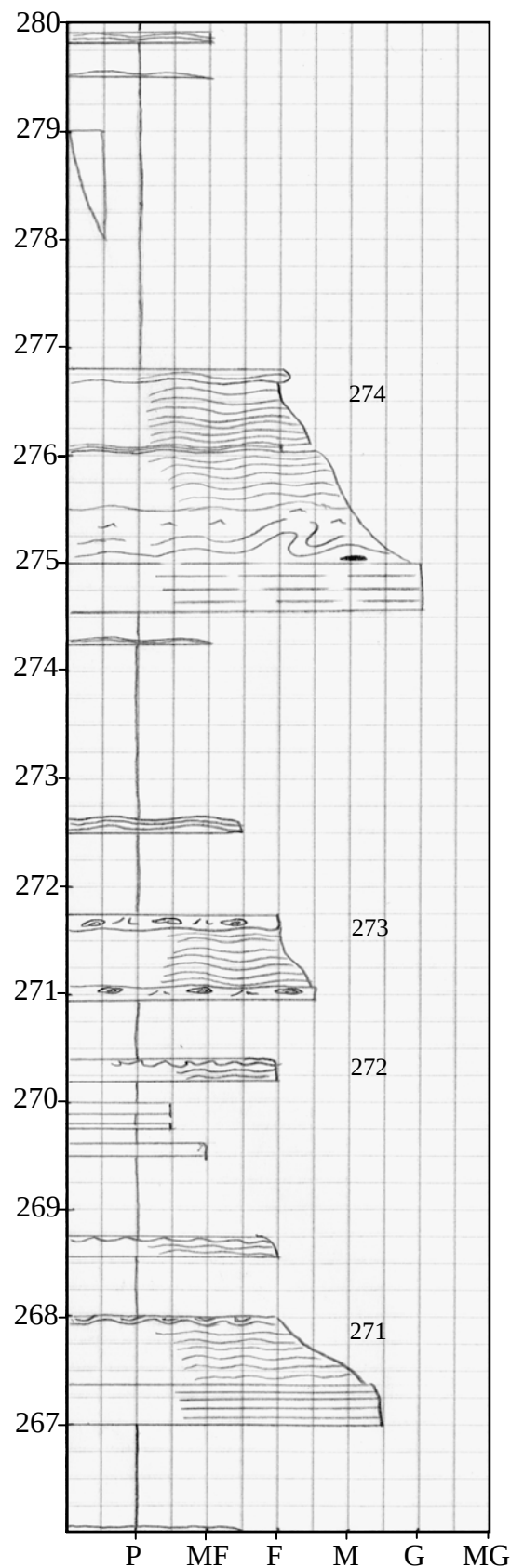
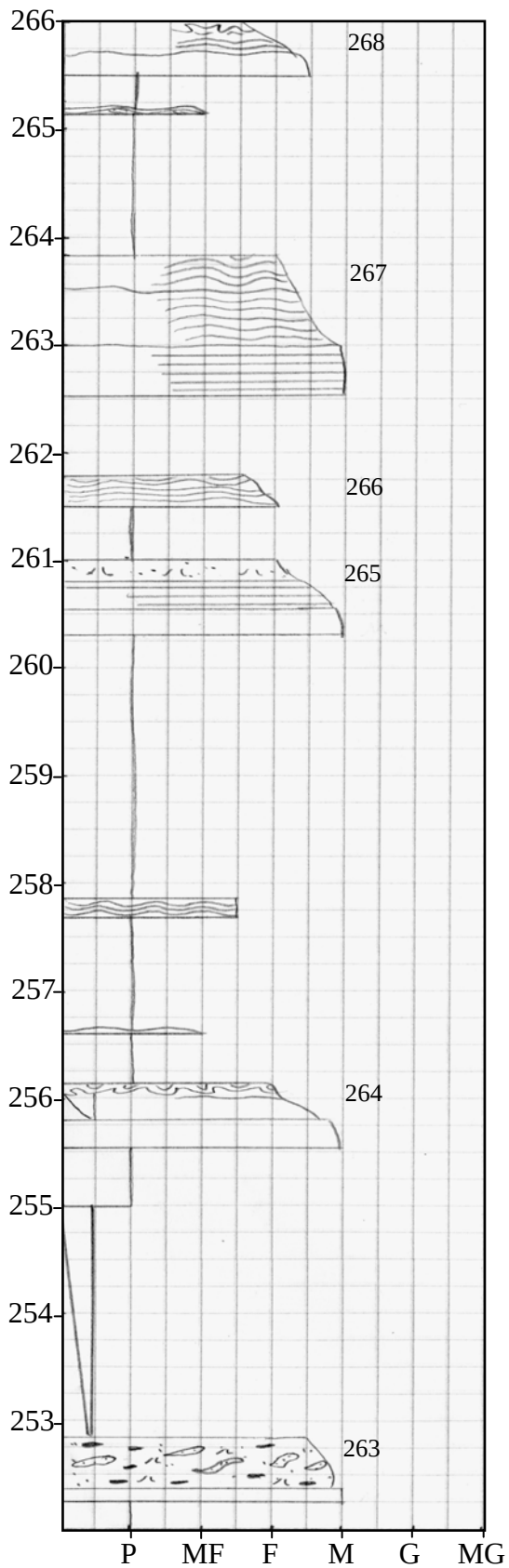
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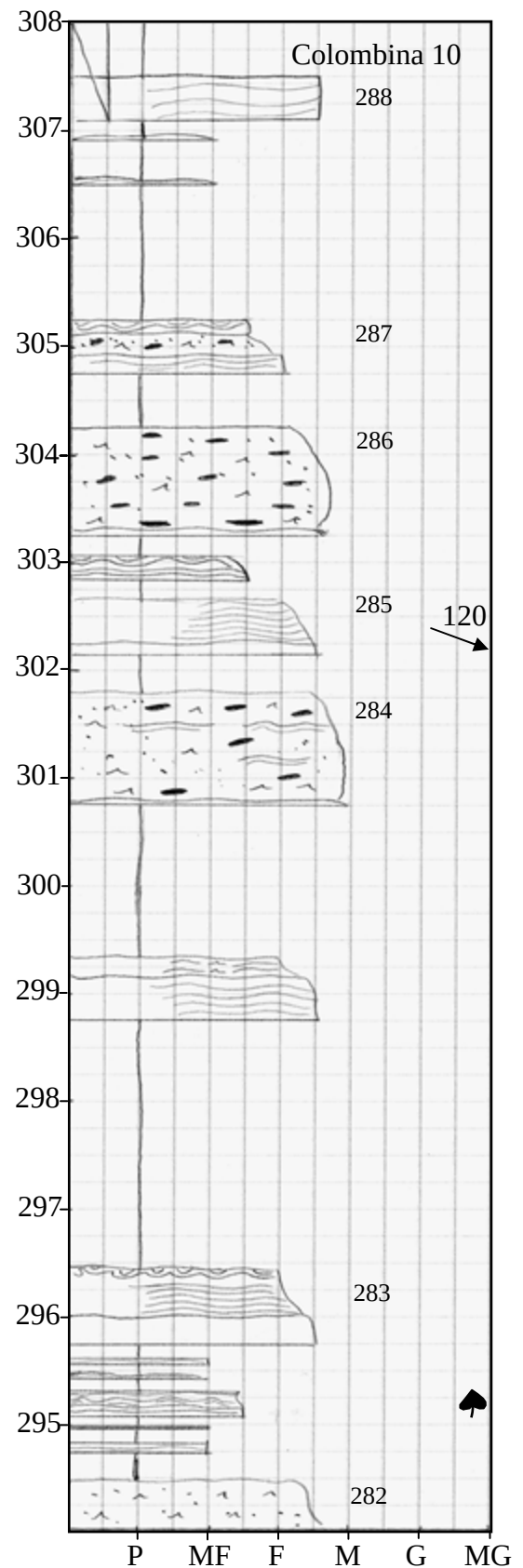
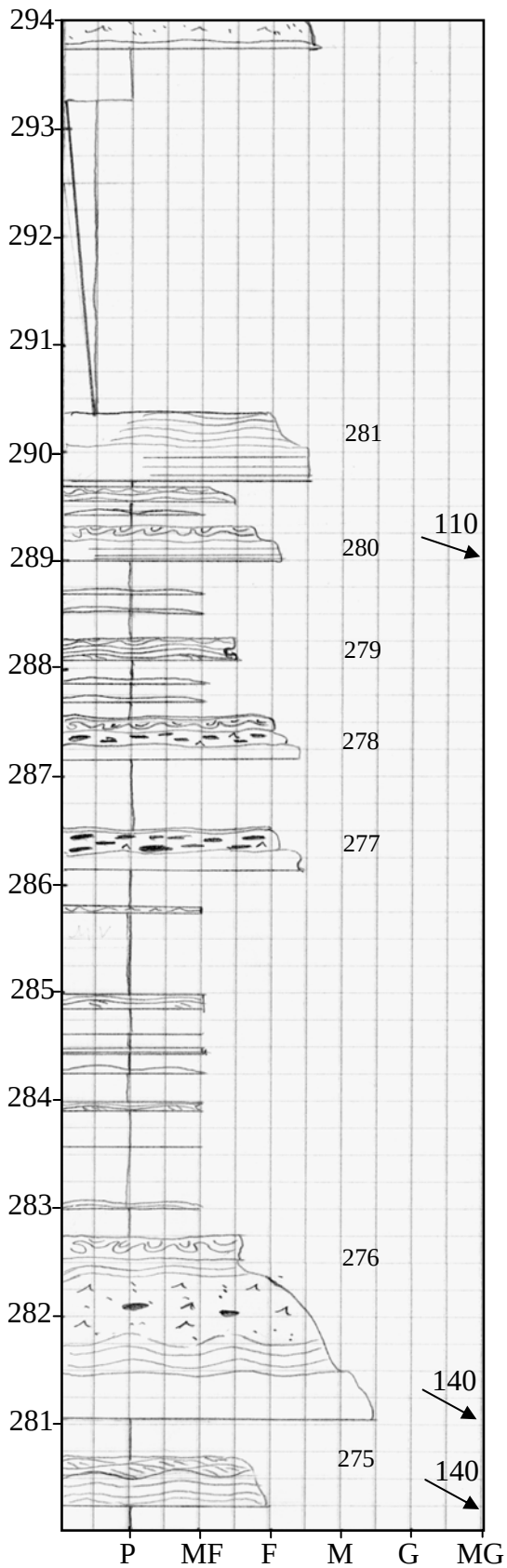
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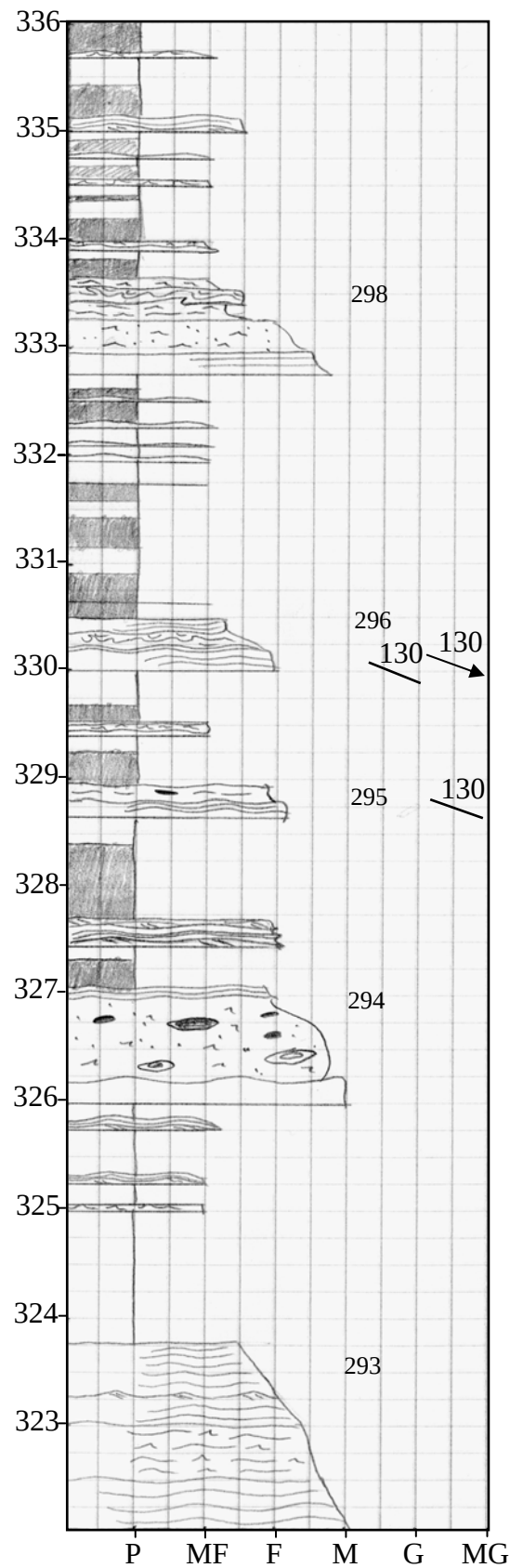
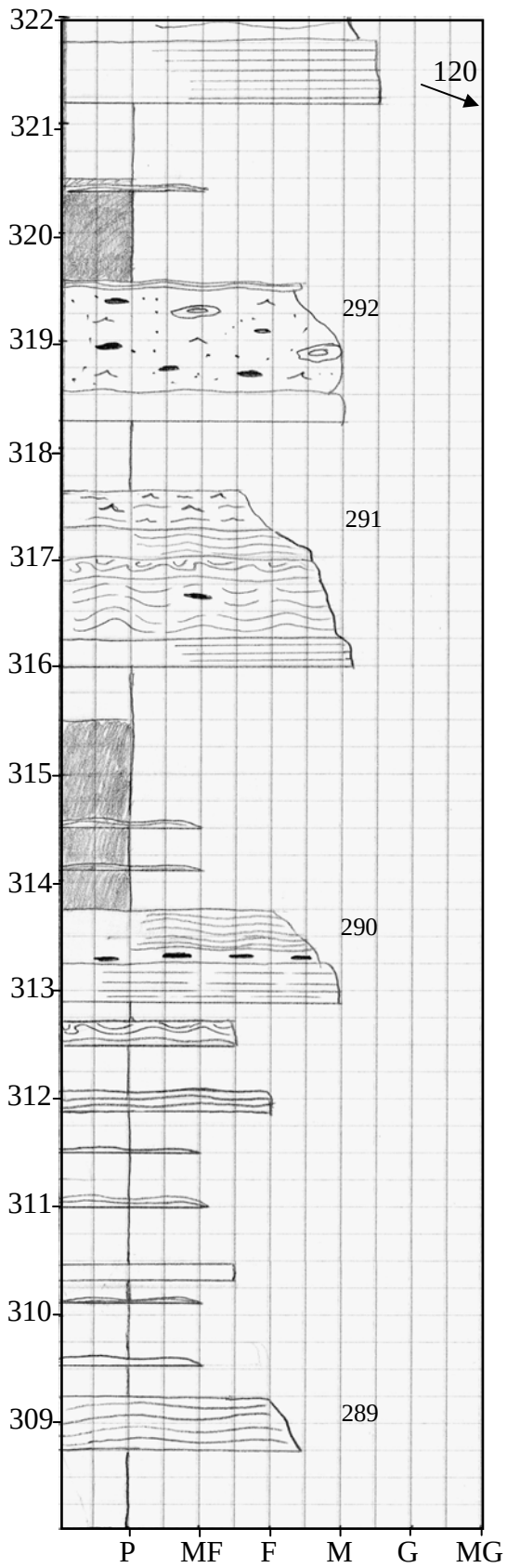
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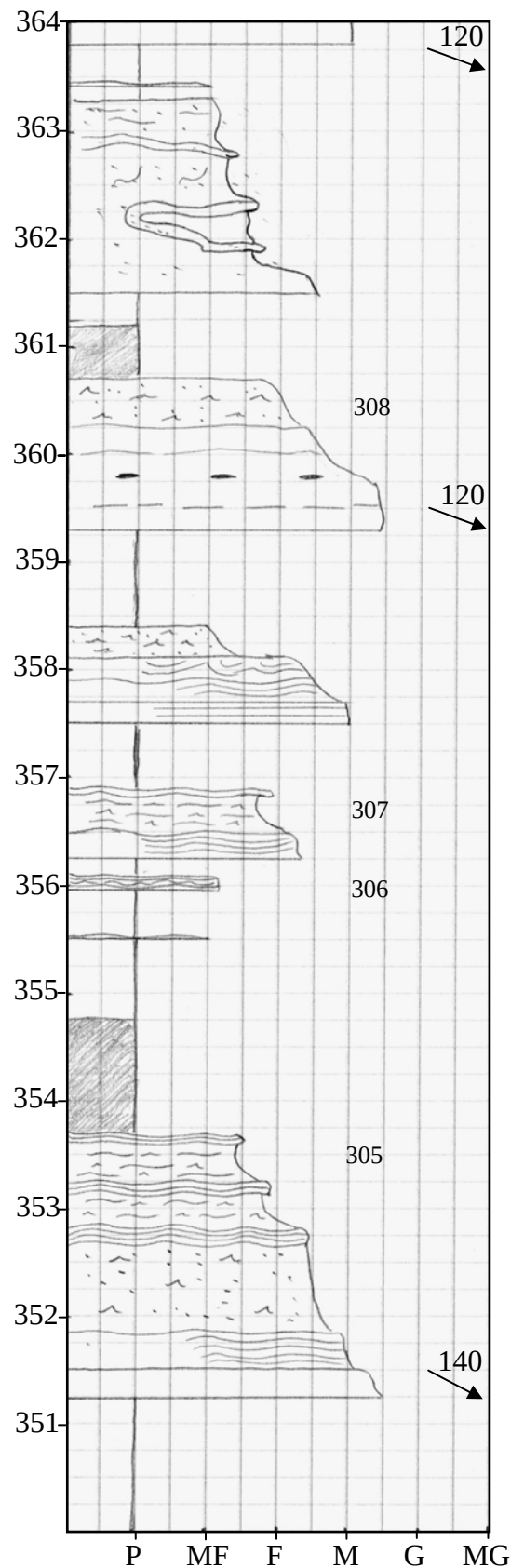
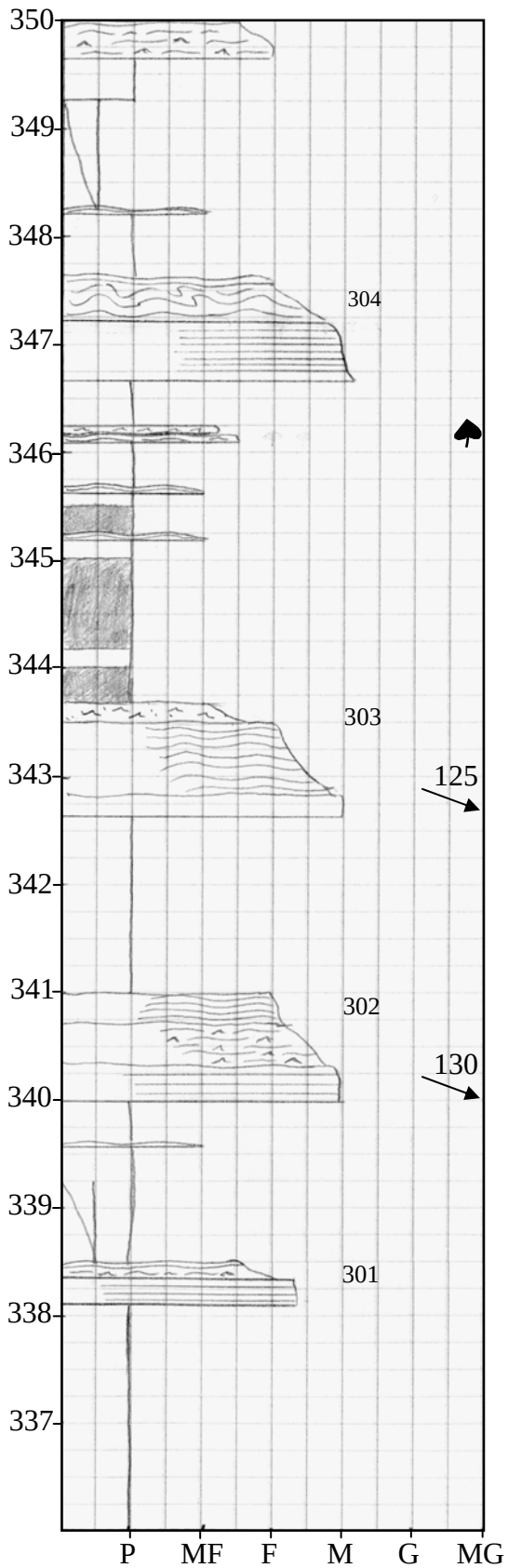
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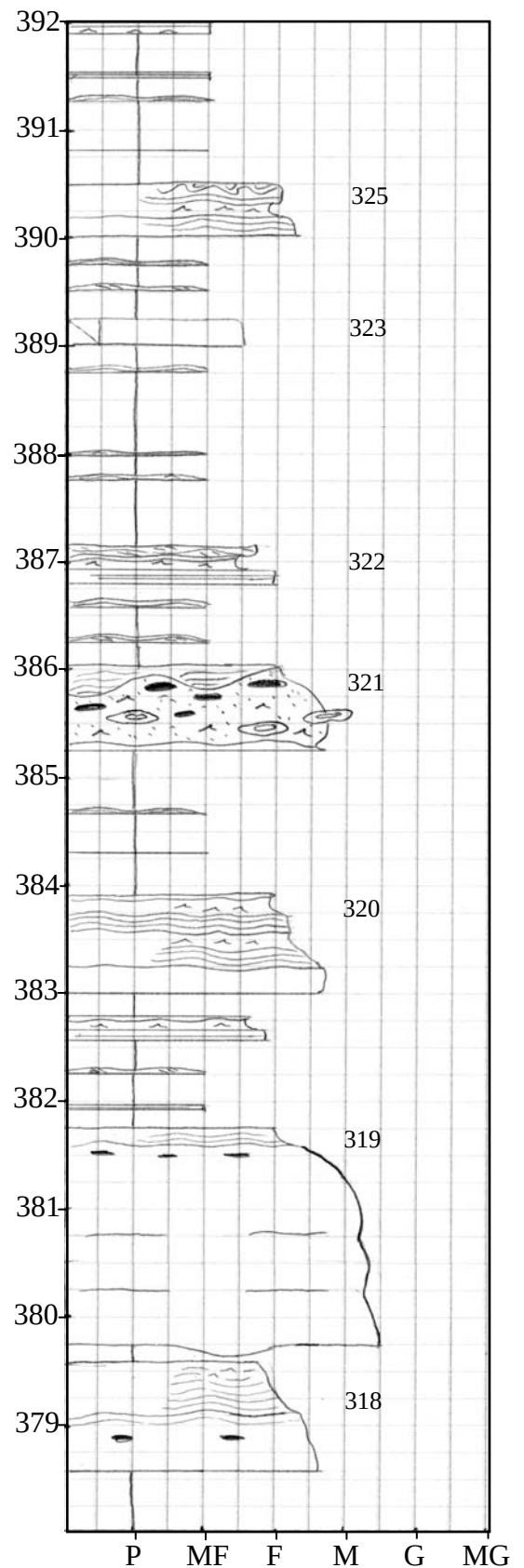
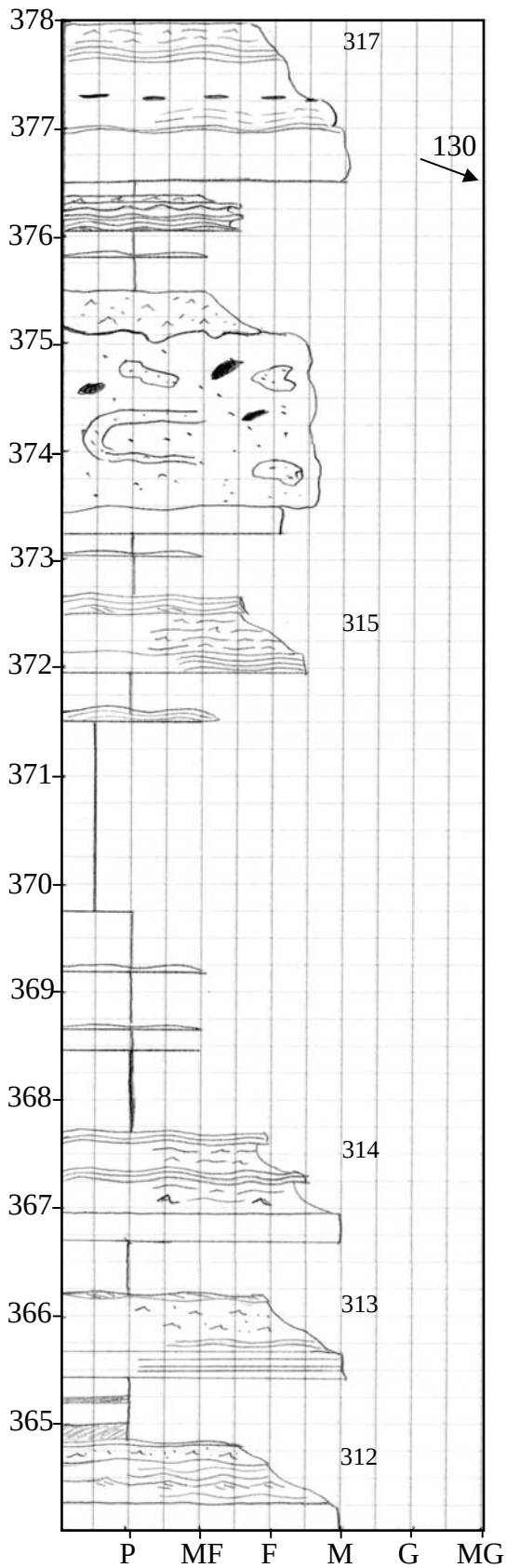
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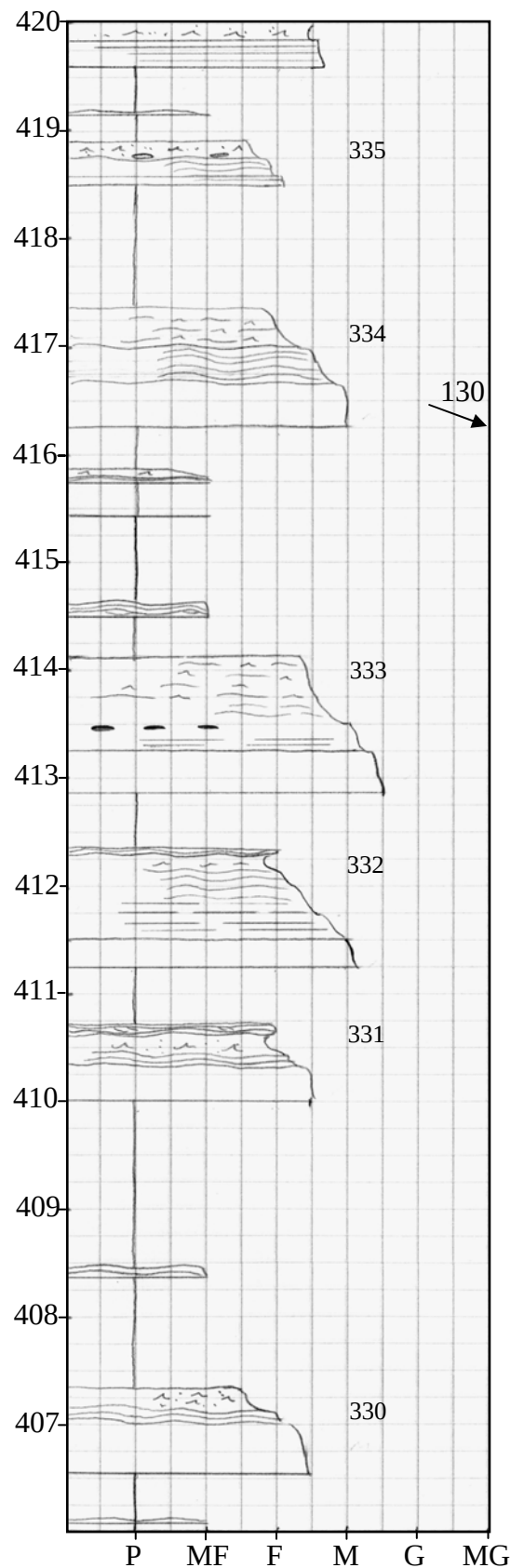
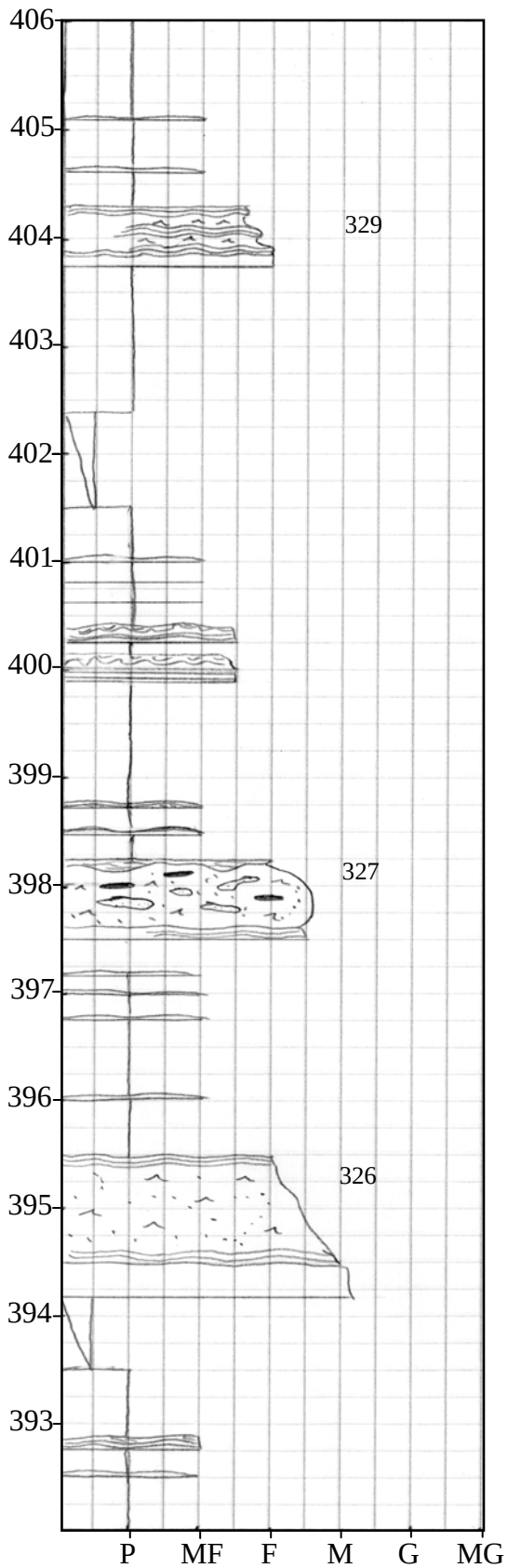
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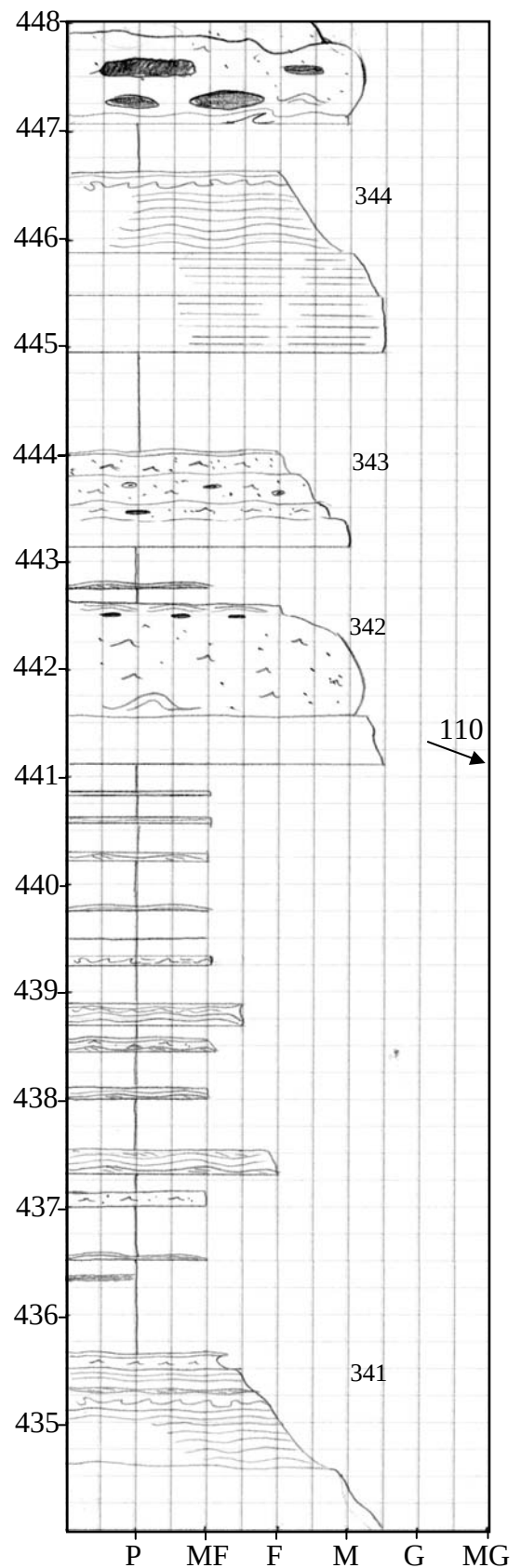
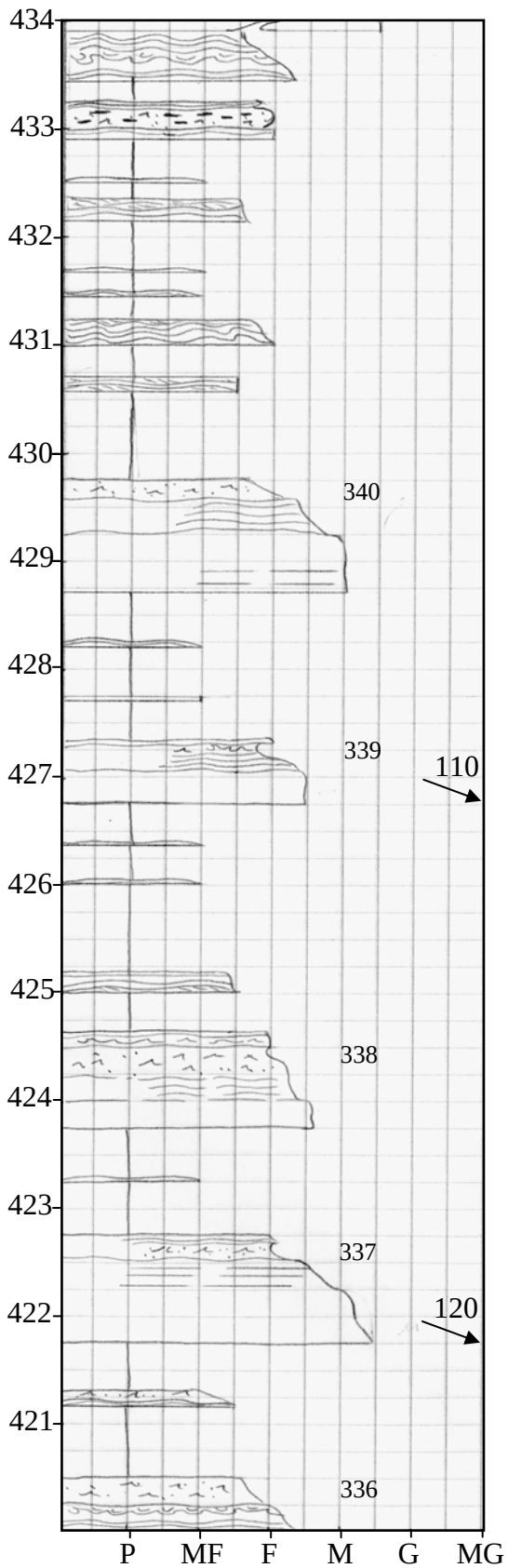
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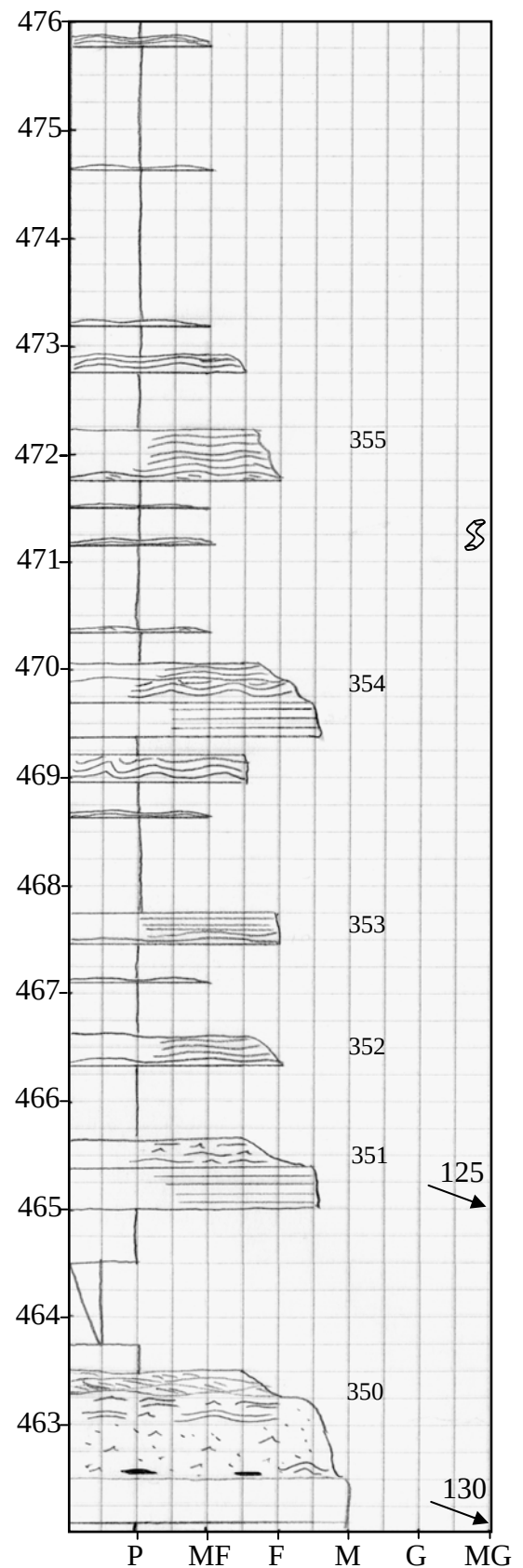
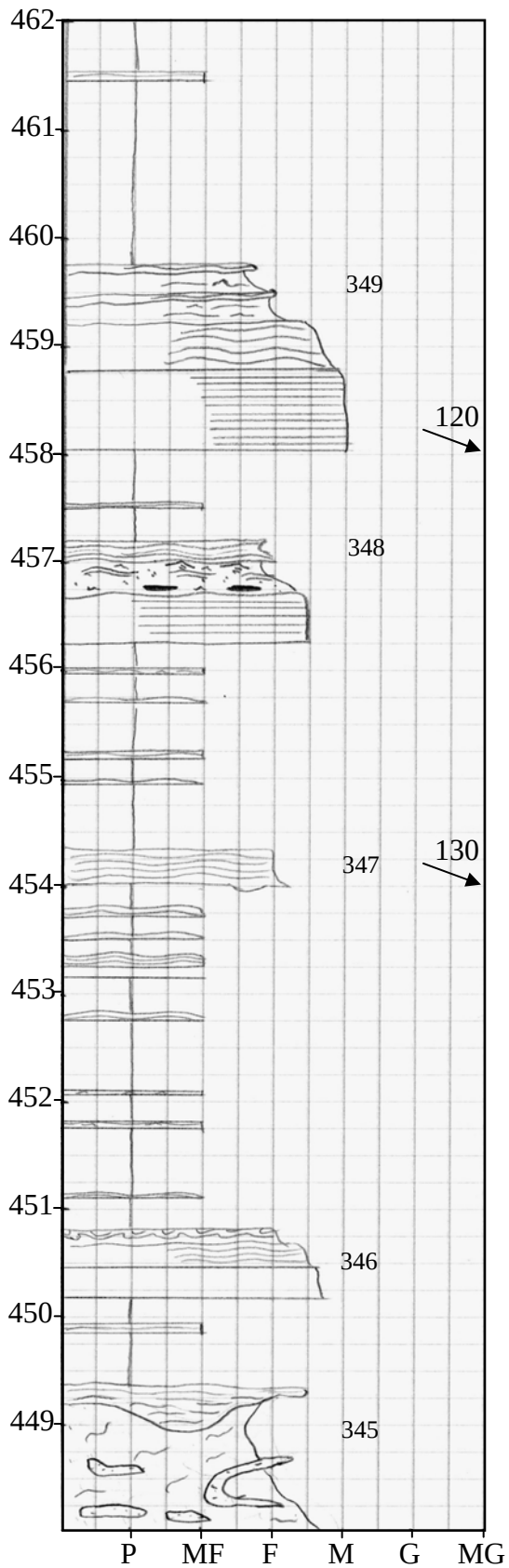
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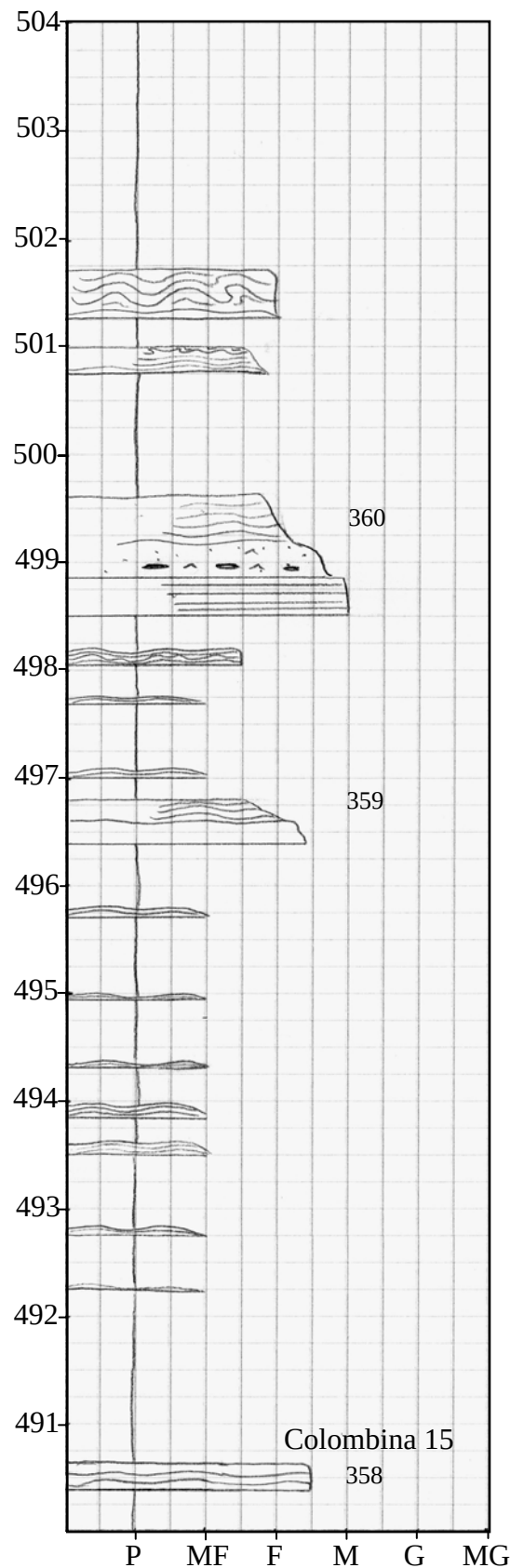
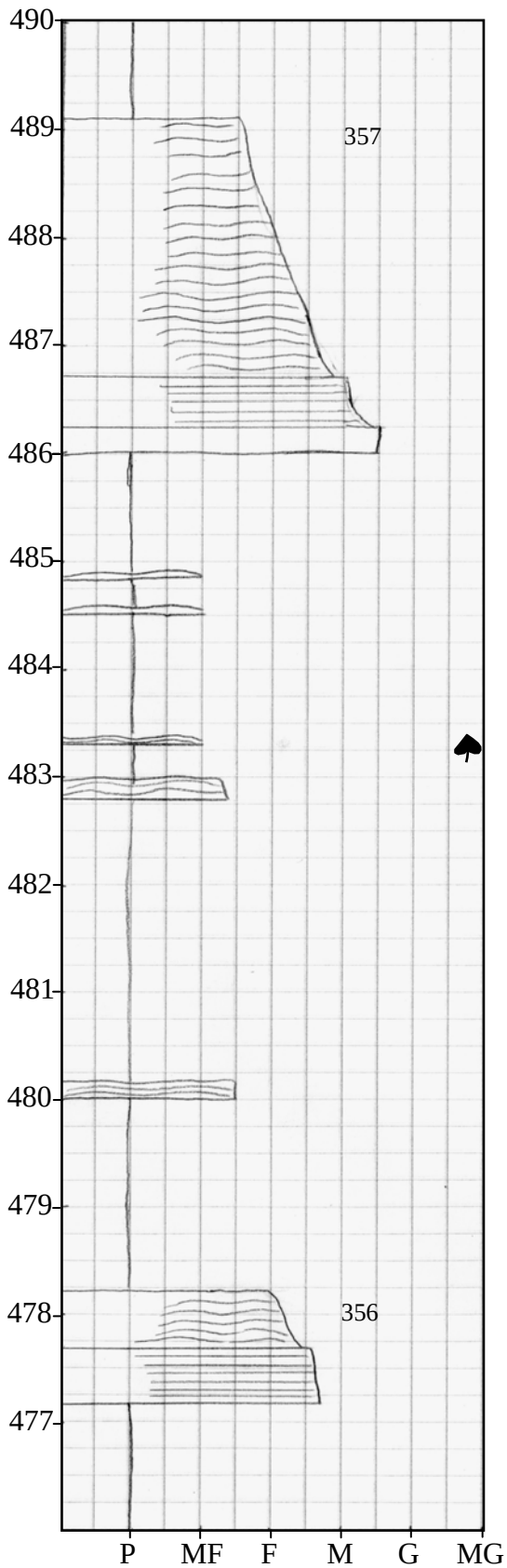
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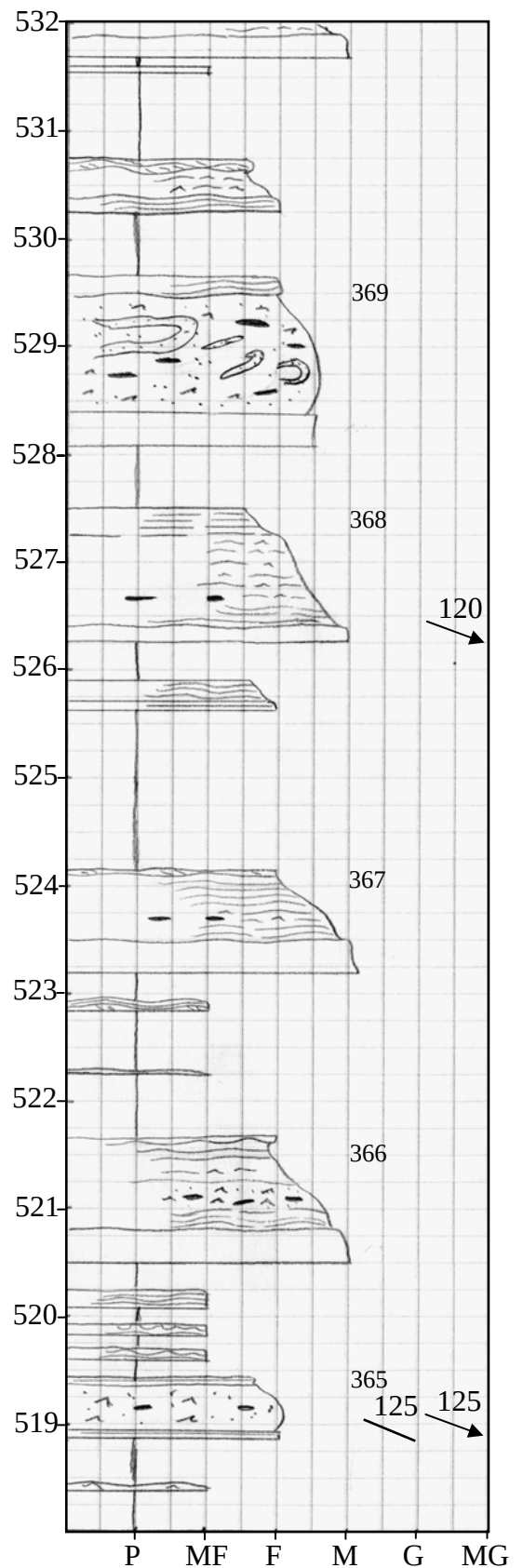
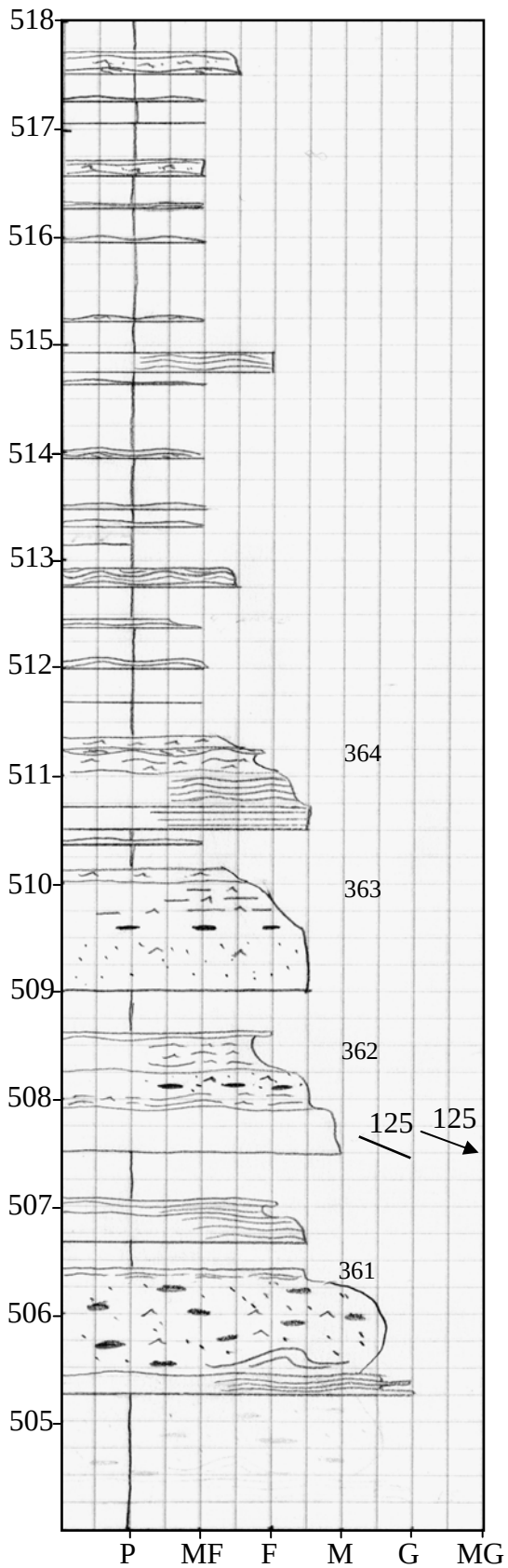
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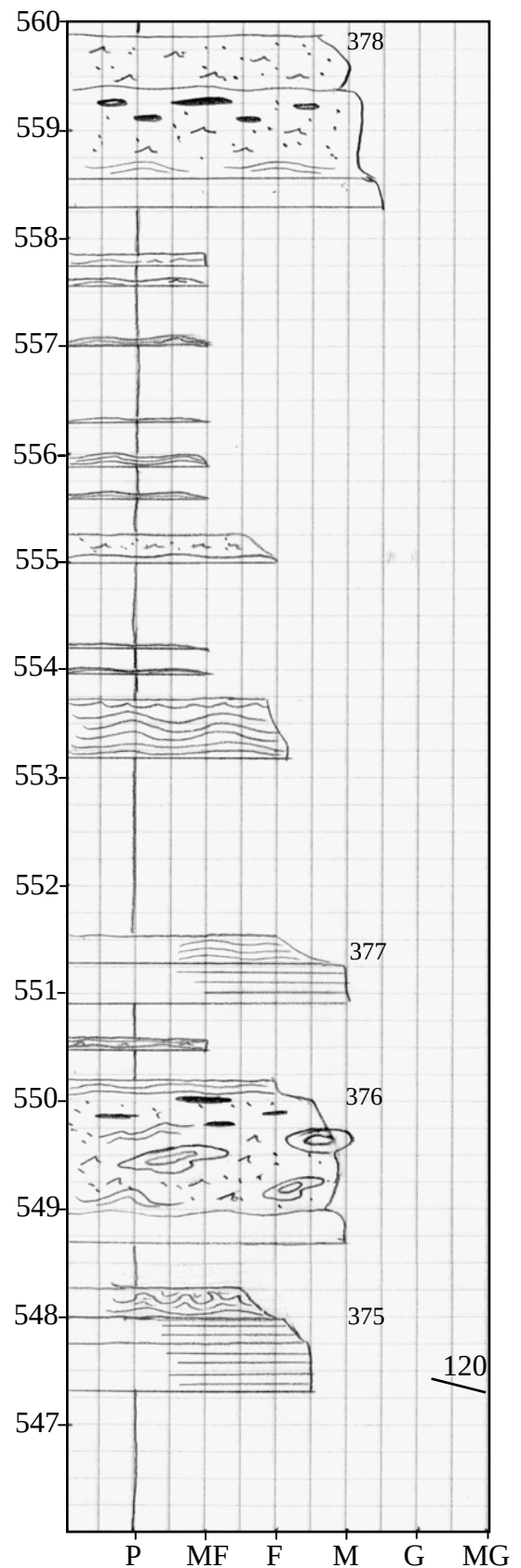
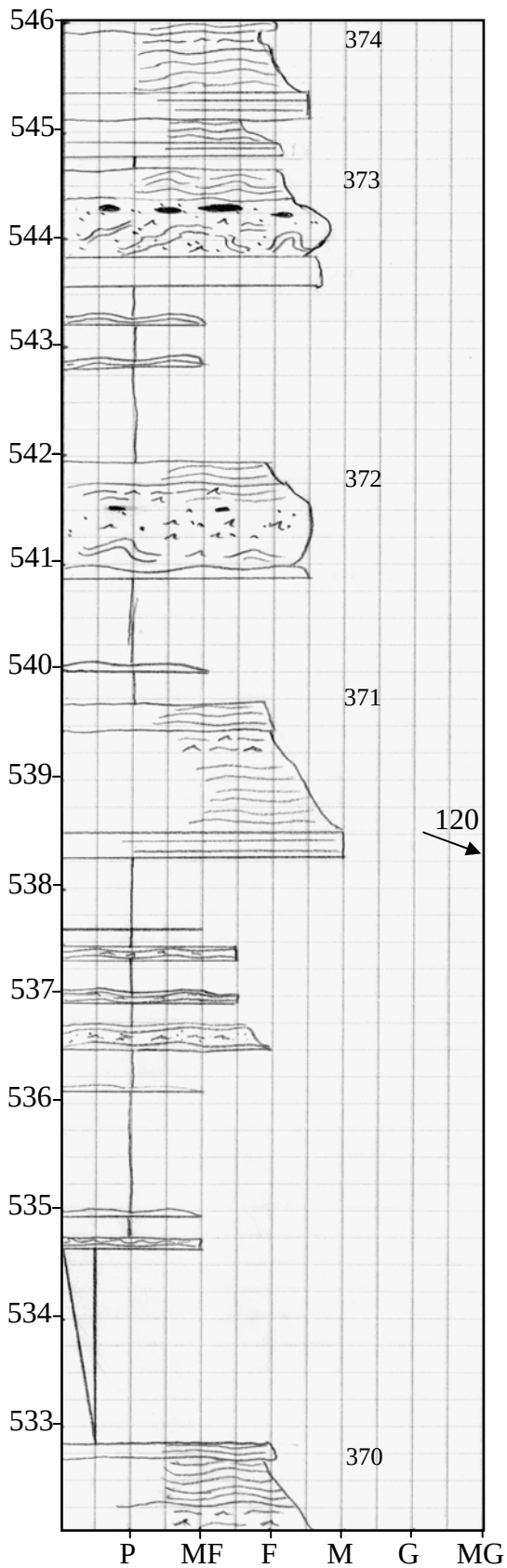
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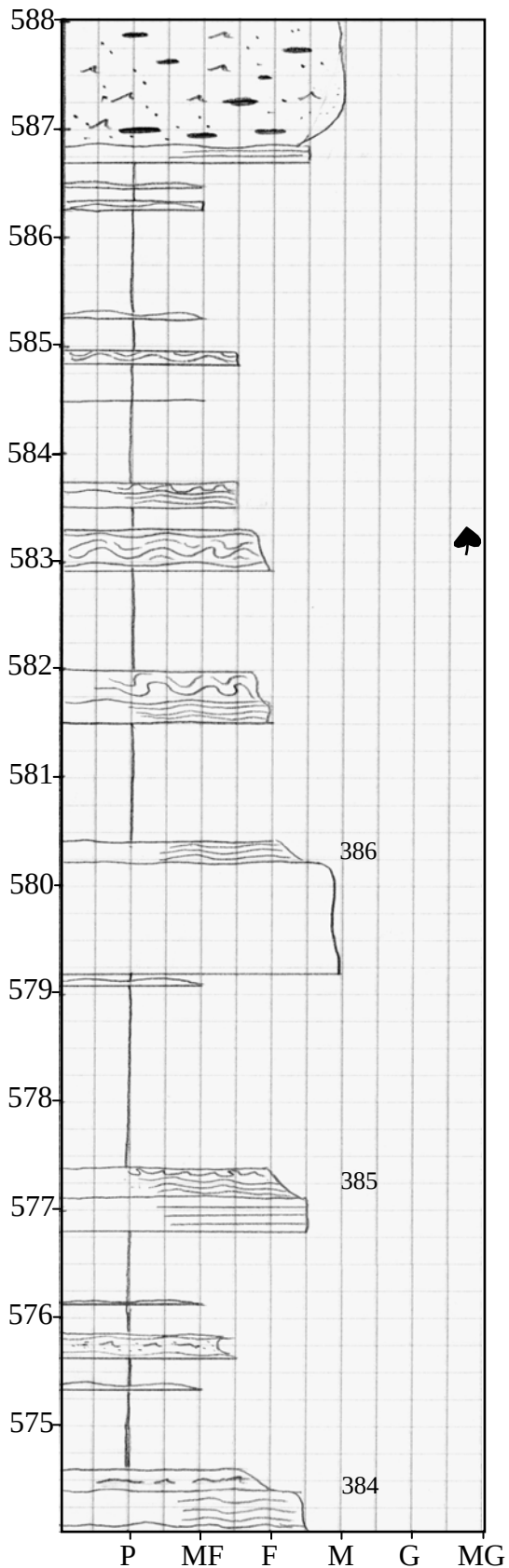
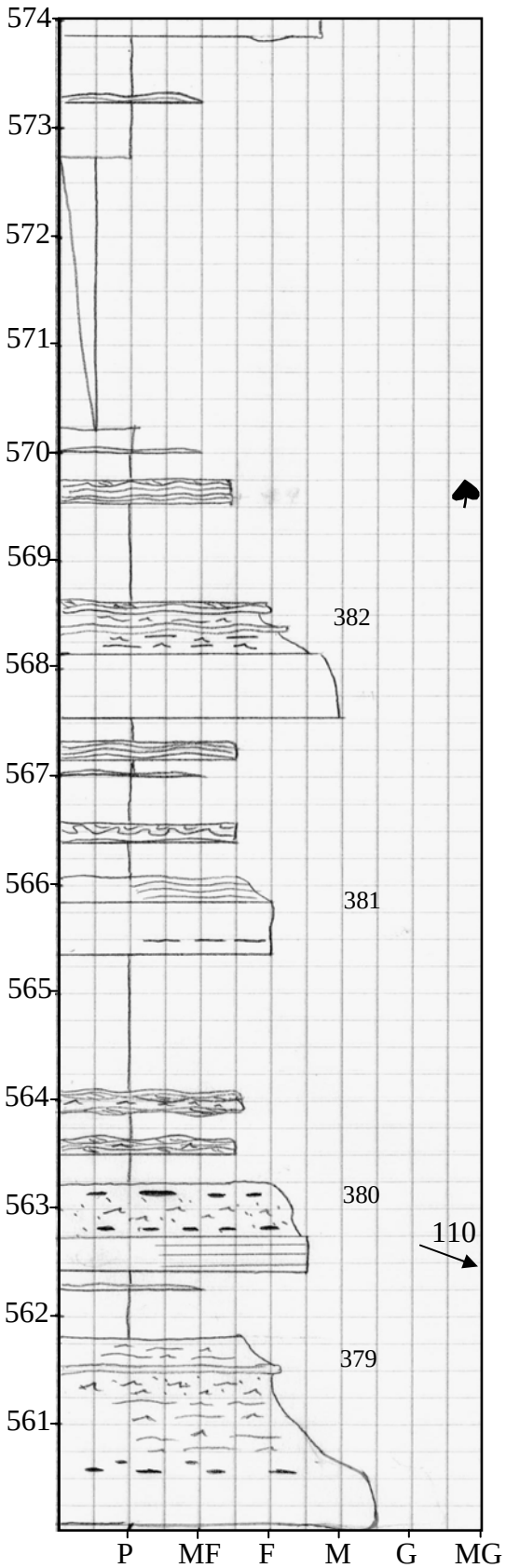
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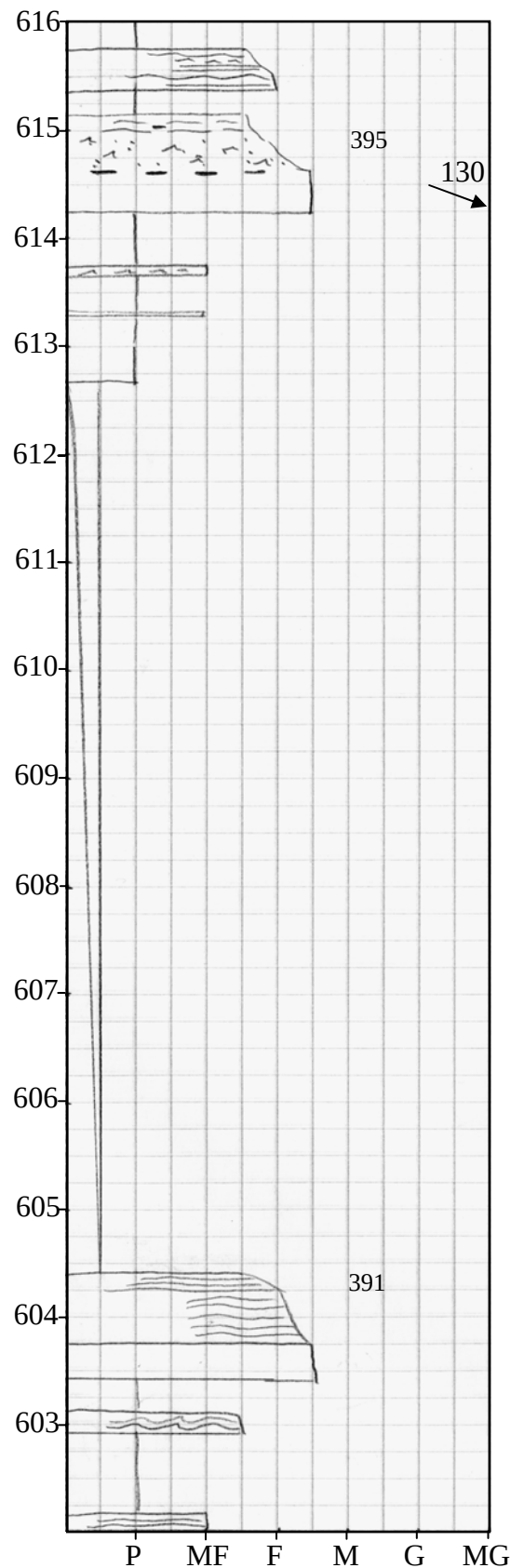
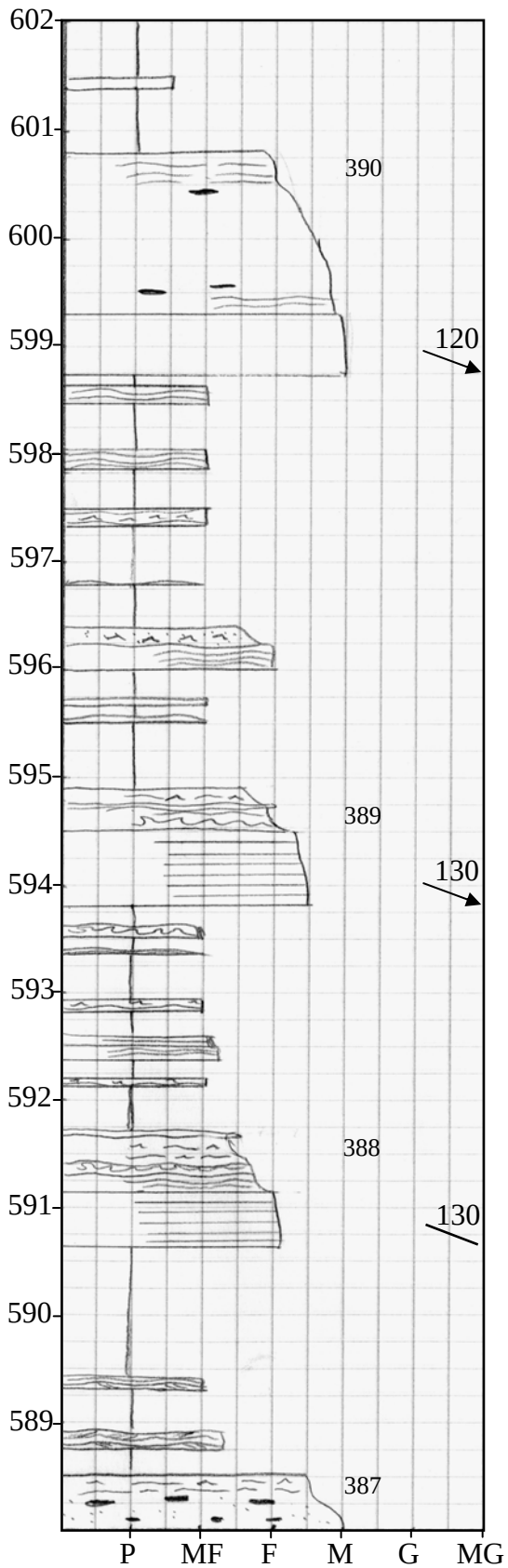
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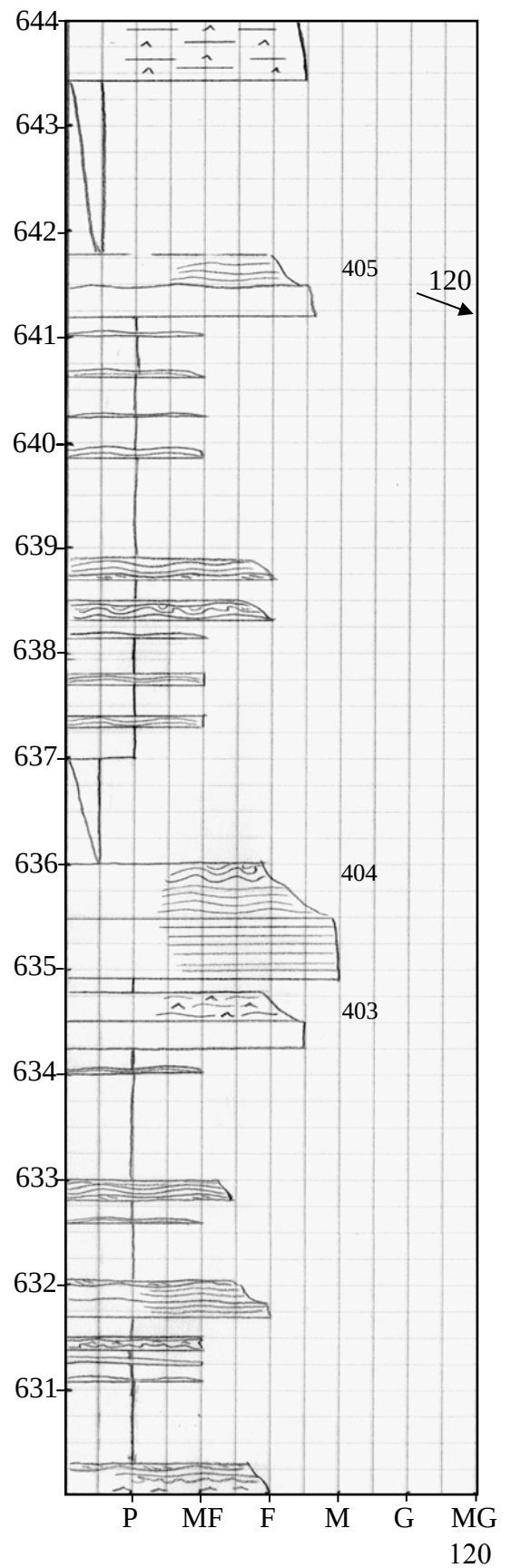
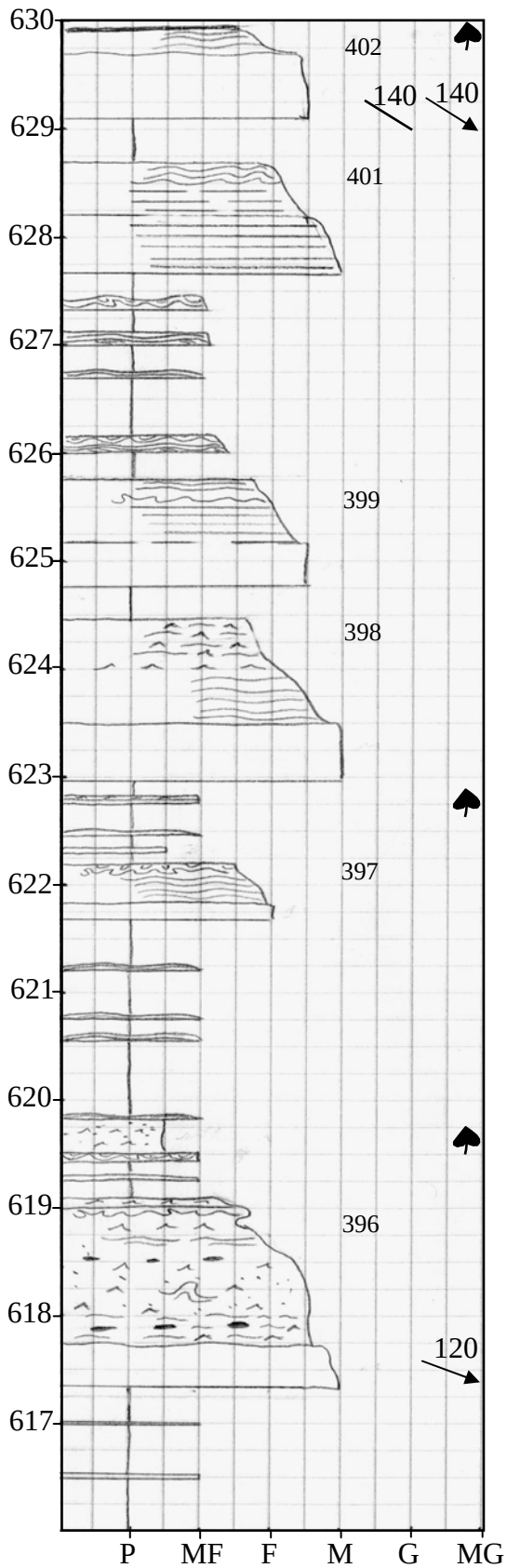
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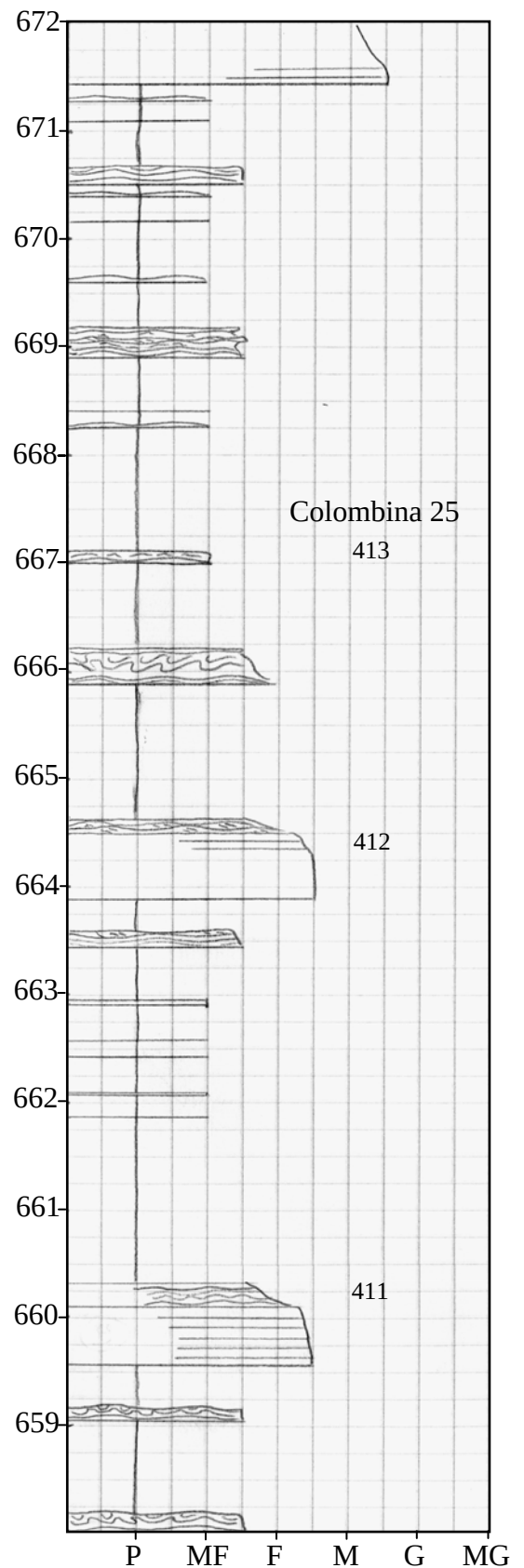
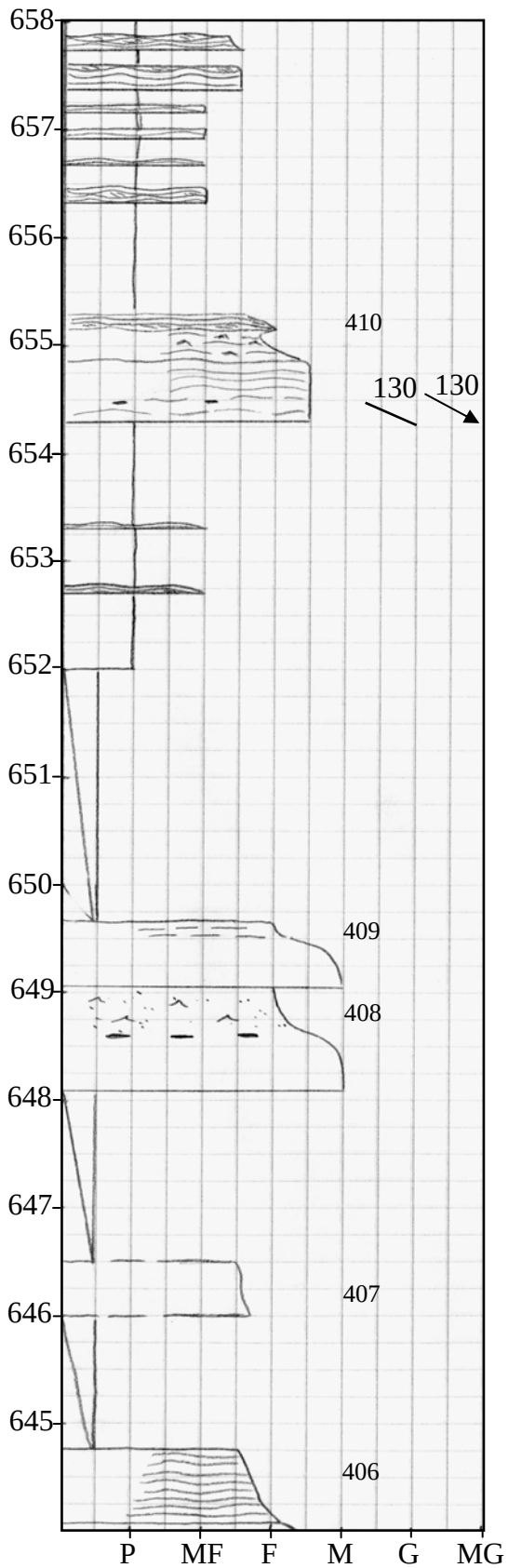
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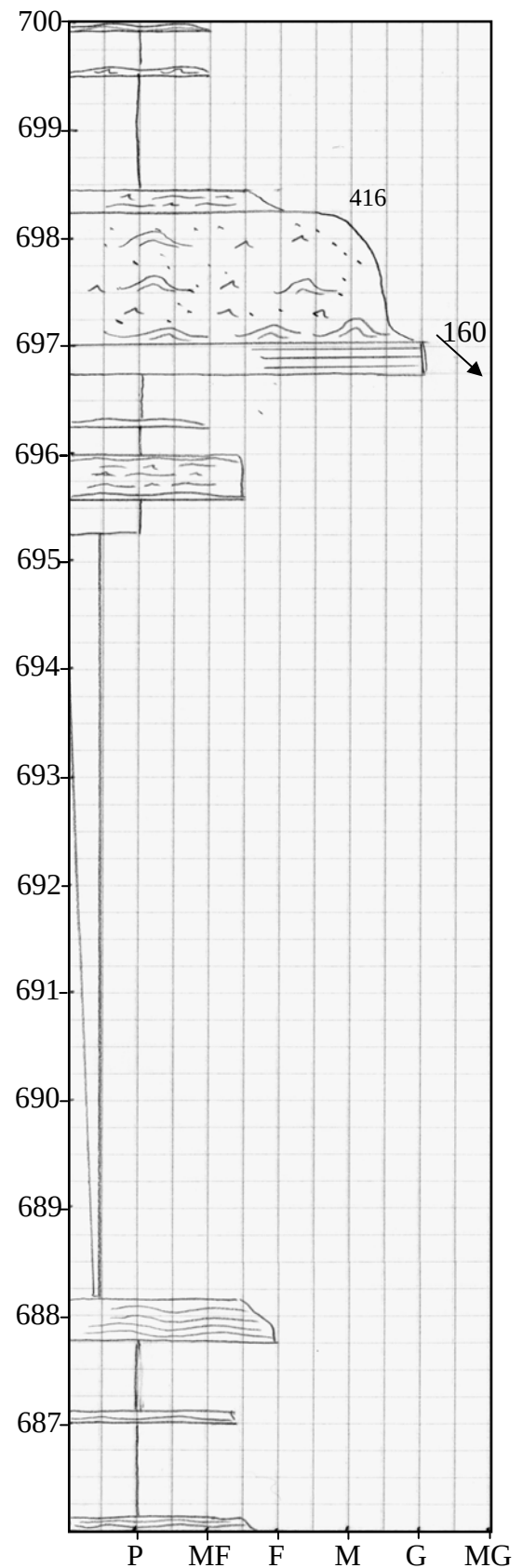
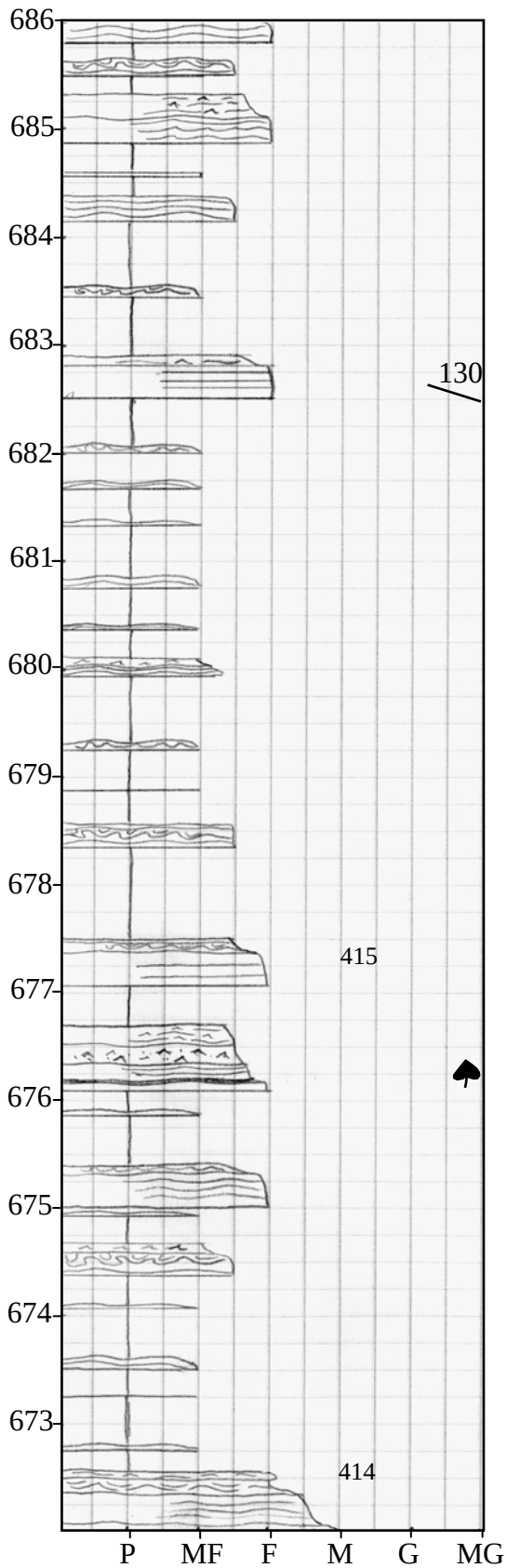
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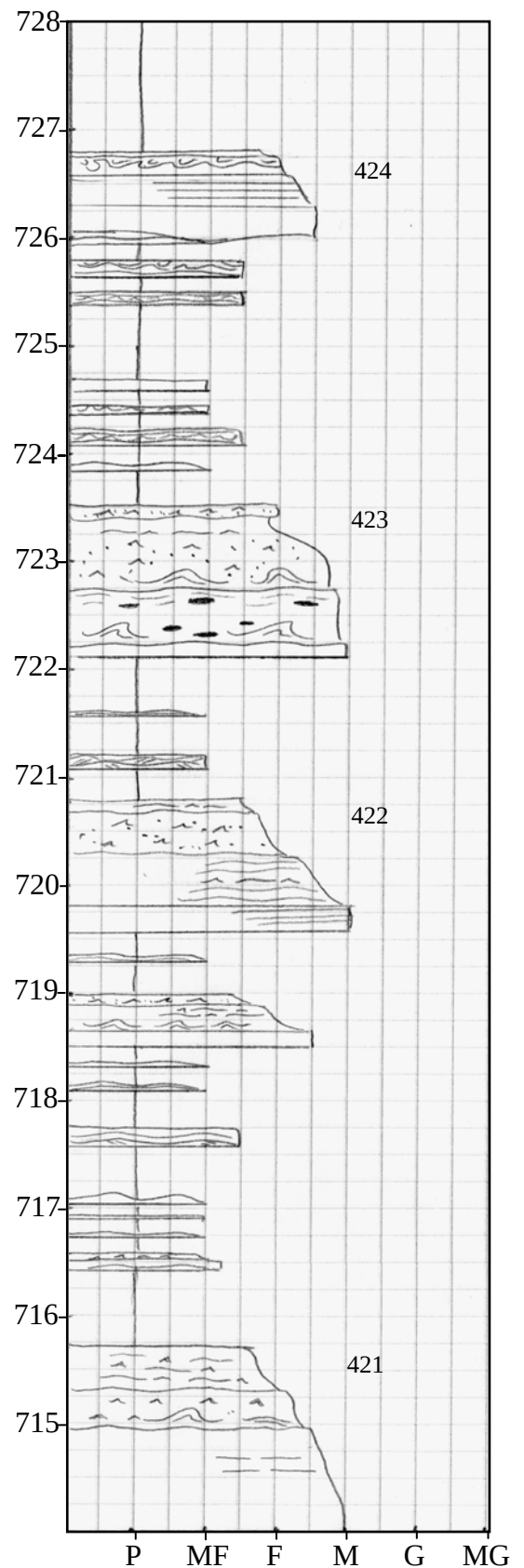
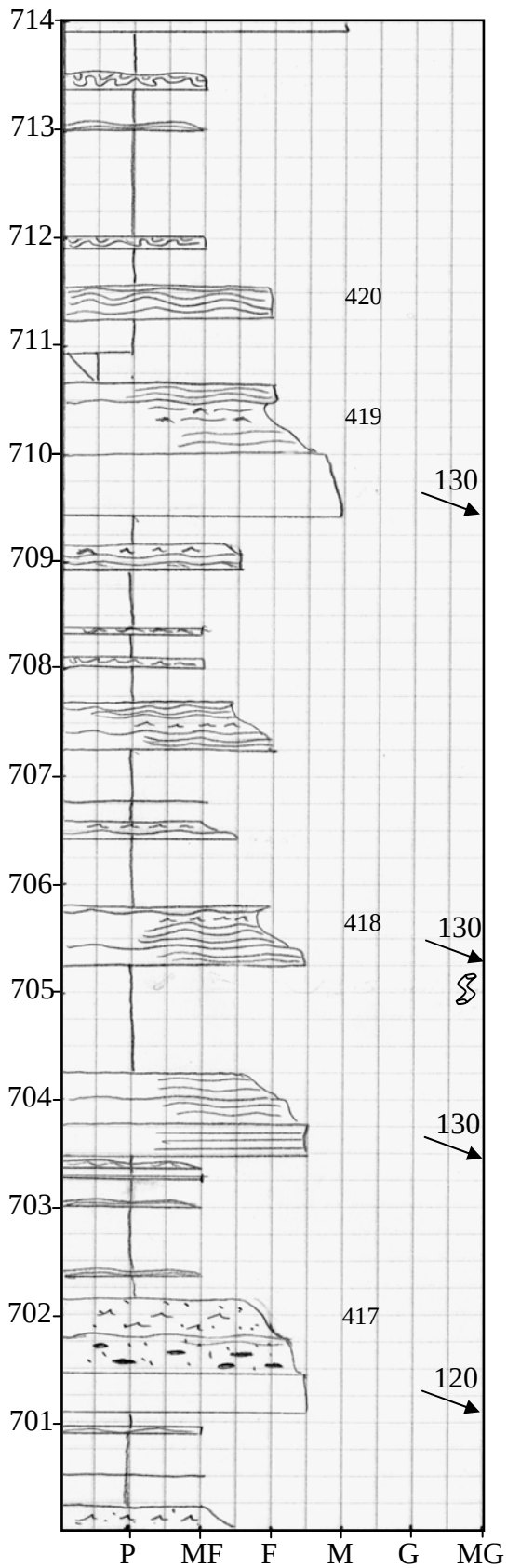
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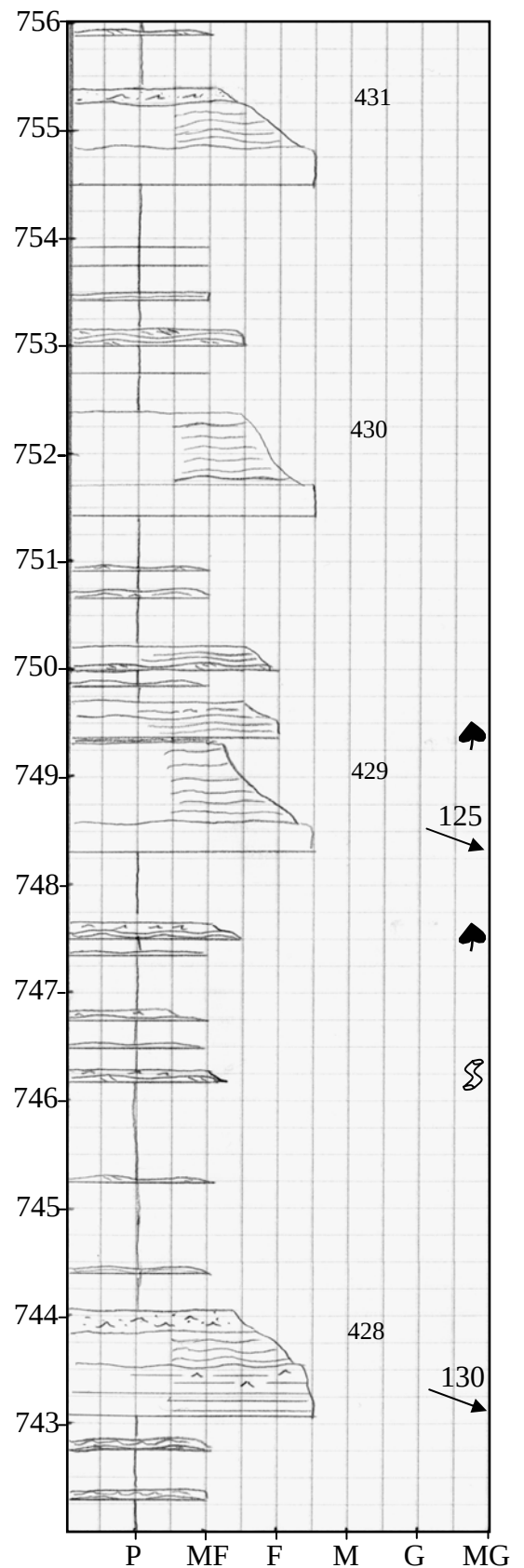
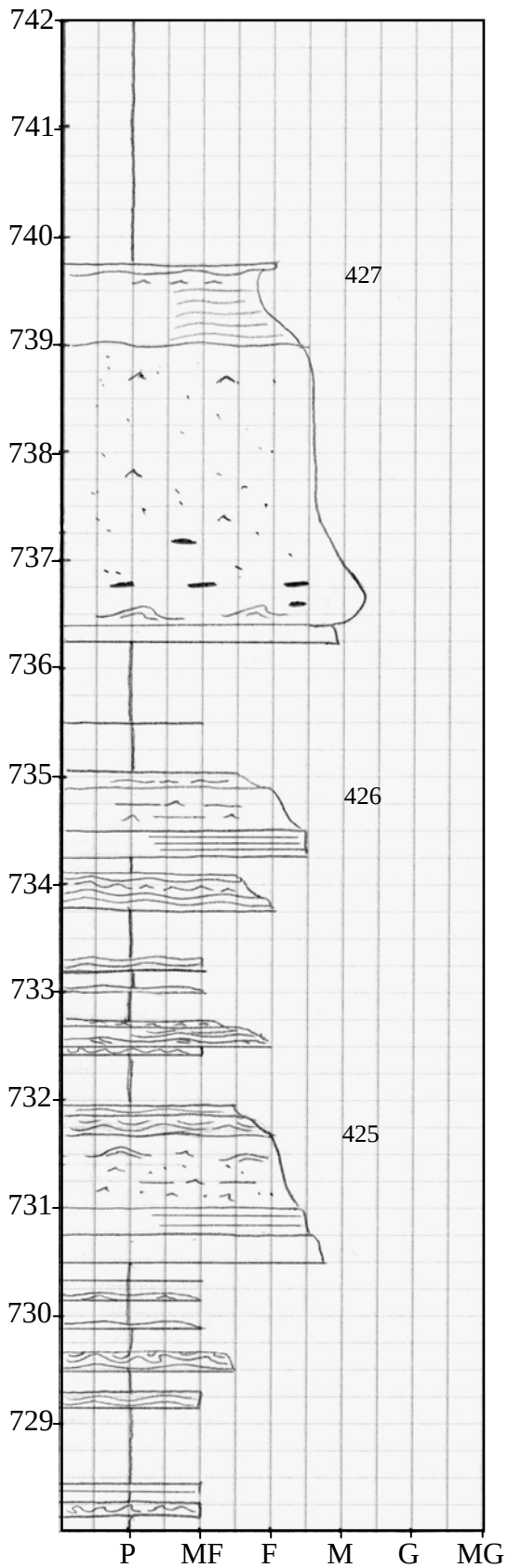
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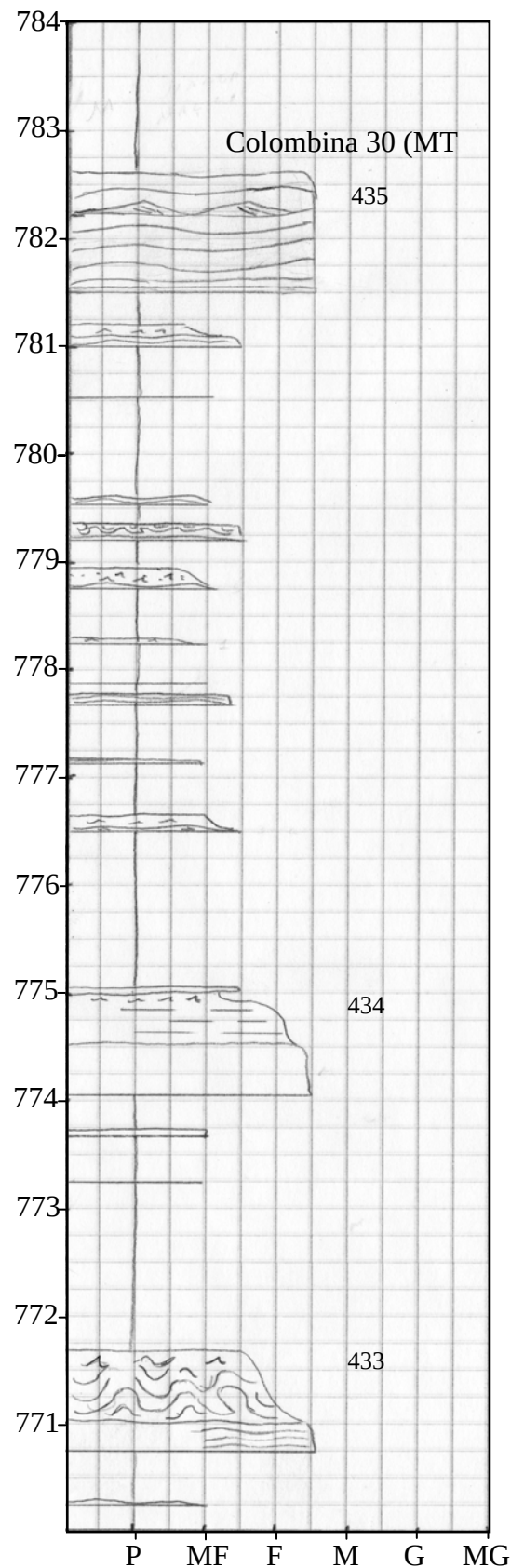
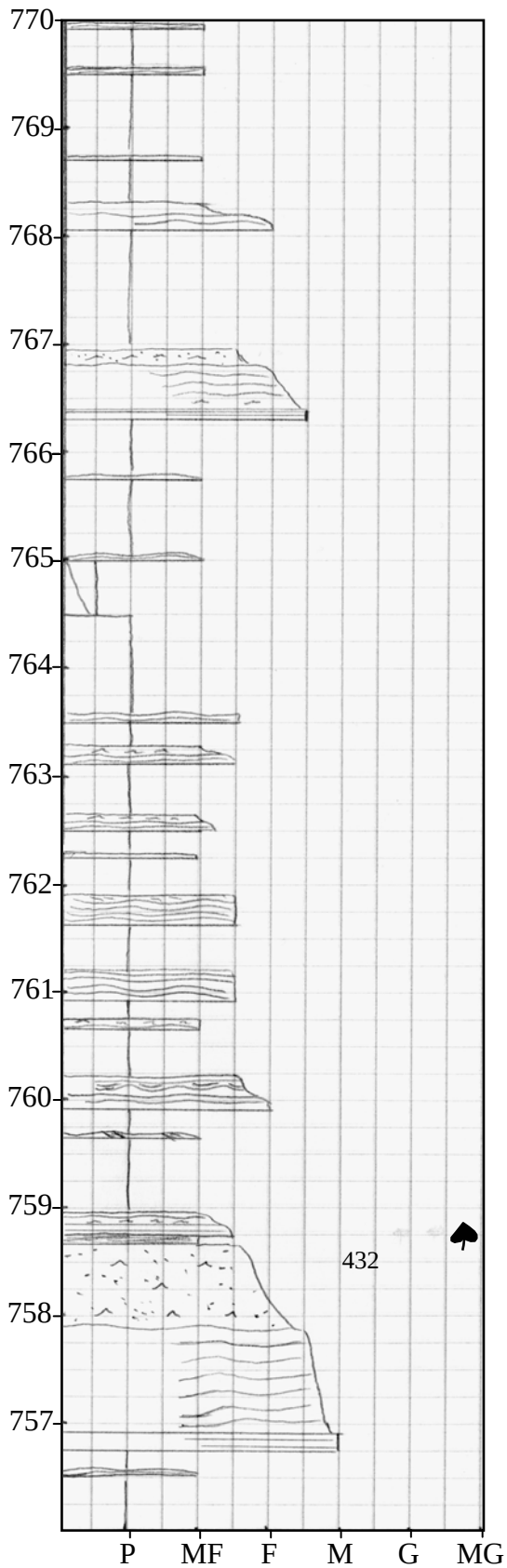
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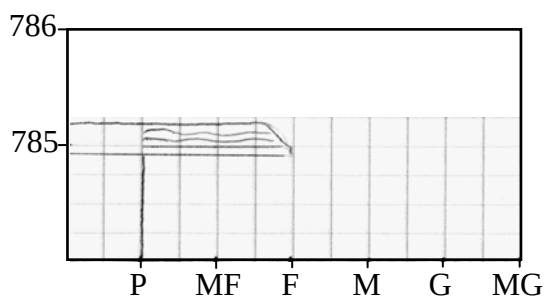
Sezione C



Sezione C



Sezione C



Sezione D

La sezione D, con 827 m di spessore, è stata misurata lungo la strada statale SS310, nei pressi della località di Lago (Fig. 6). La base della sezione è ubicata vicino al Castello di Corniolino dove affiora lo strato guida Io (vedasi capitolo 5, Volume I). In particolare, la successione sedimentaria affiora molto bene lungo la statale SS310, ad eccezione fatta della parte basale dello strato guida Contessa e dell'intervallo a cavallo delle colombine 3 e 4. Questi ultimi intervalli sono stati misurati più a sud lungo la strada che porta a S. Agostino (Fig. 6). In ogni caso, la presenza di una faglia nella parte superiore della sezione, al di sopra dello strato 325, ha reso impossibile la continuazione del lavoro.

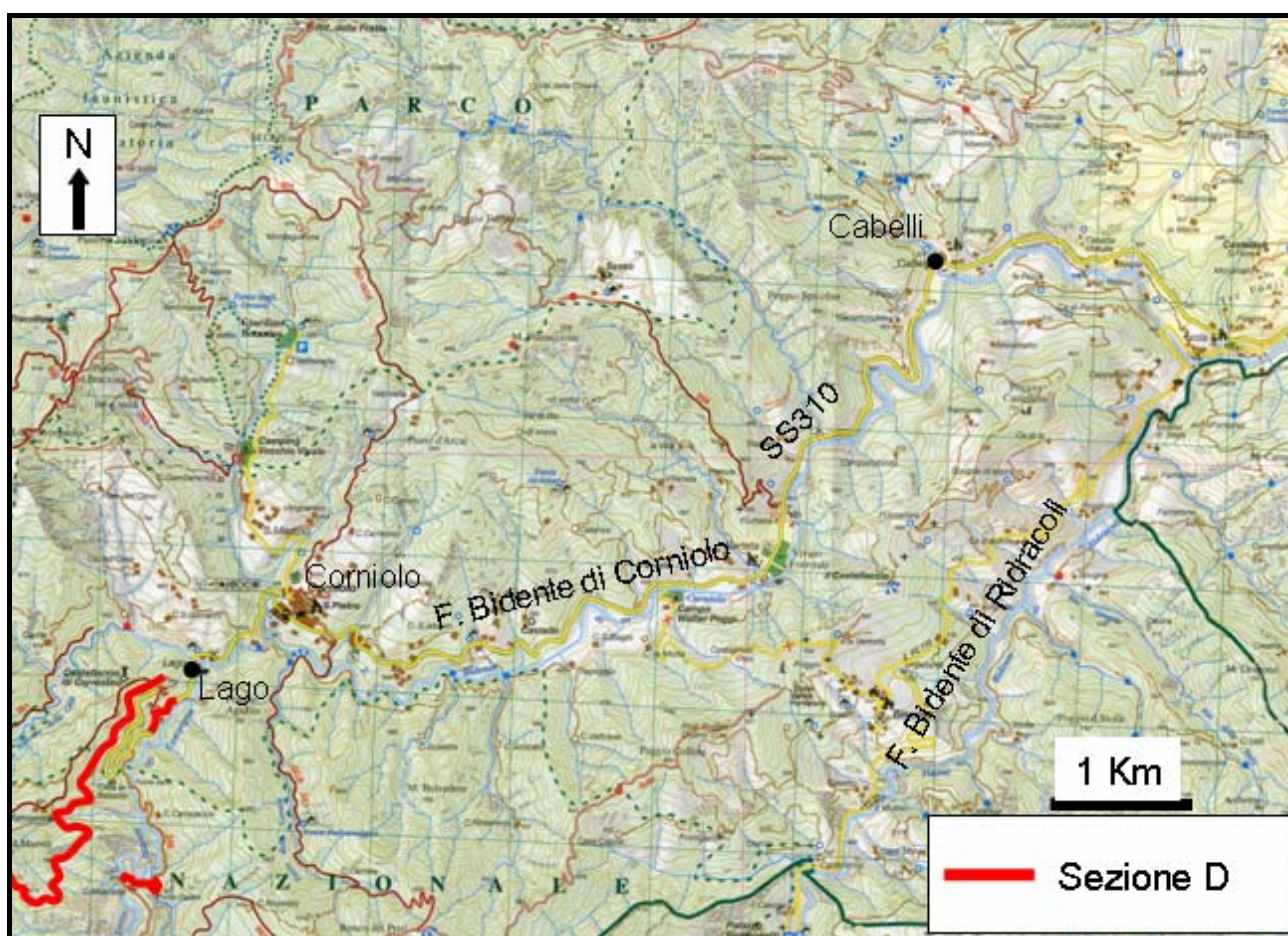
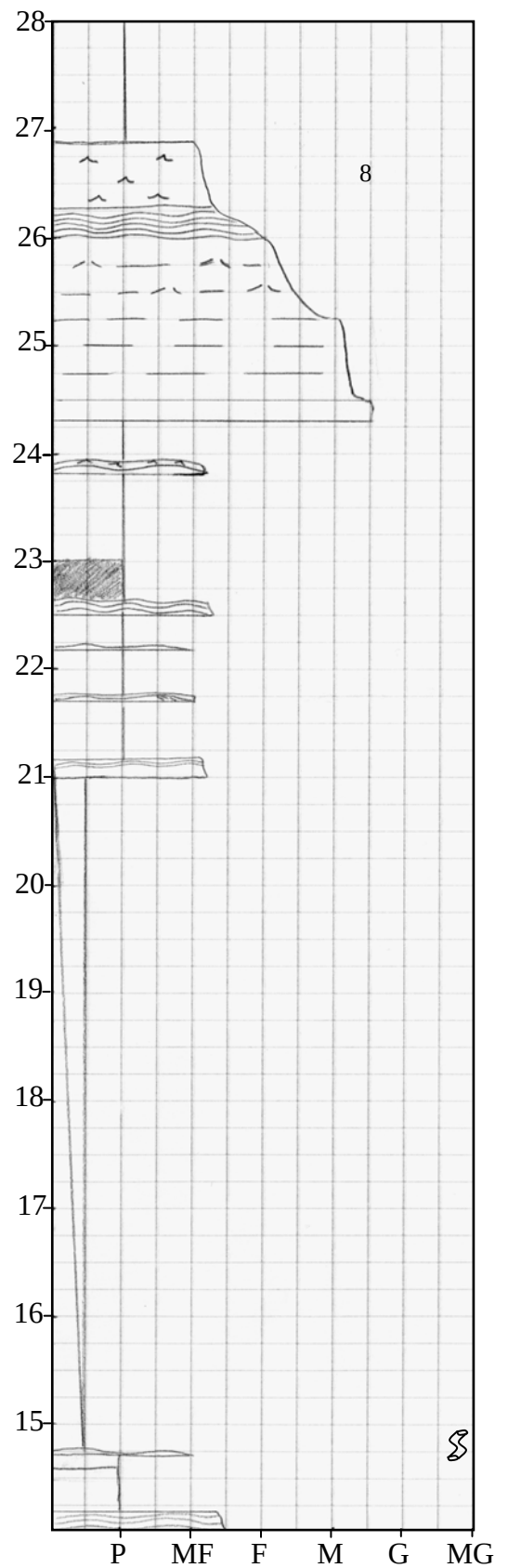
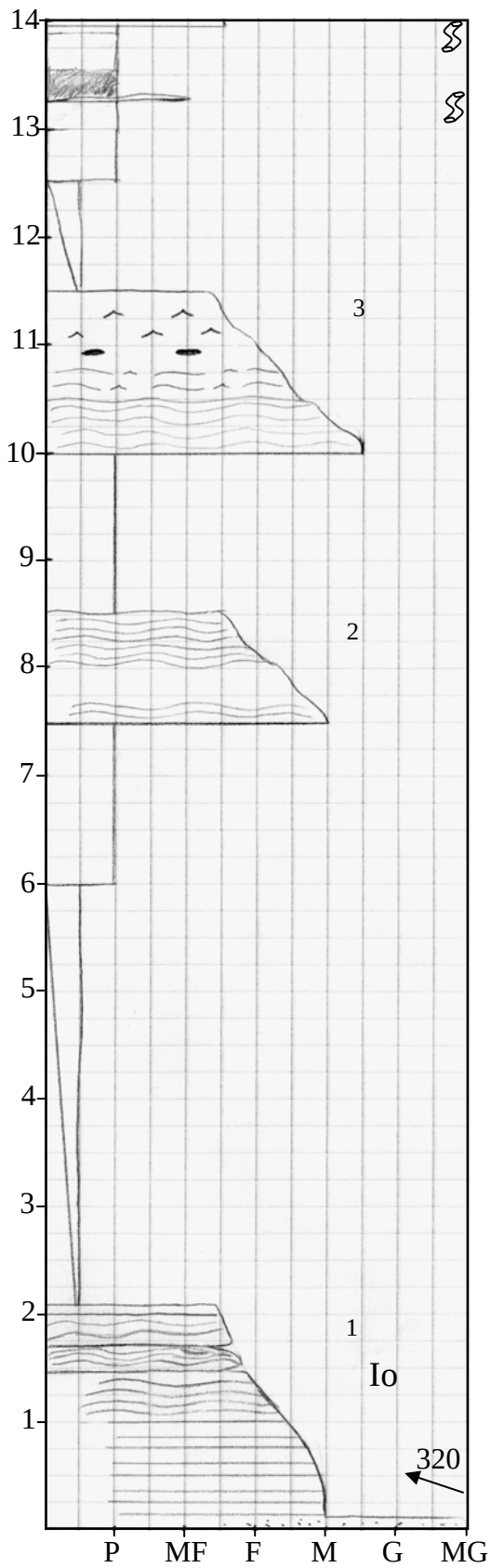
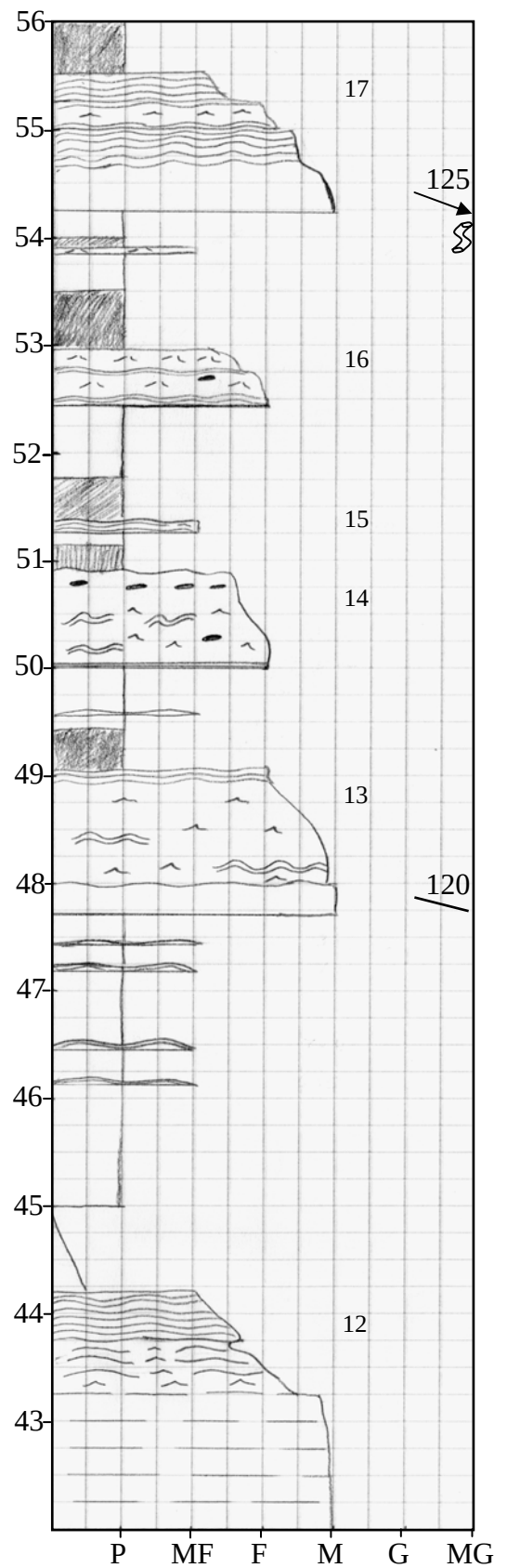
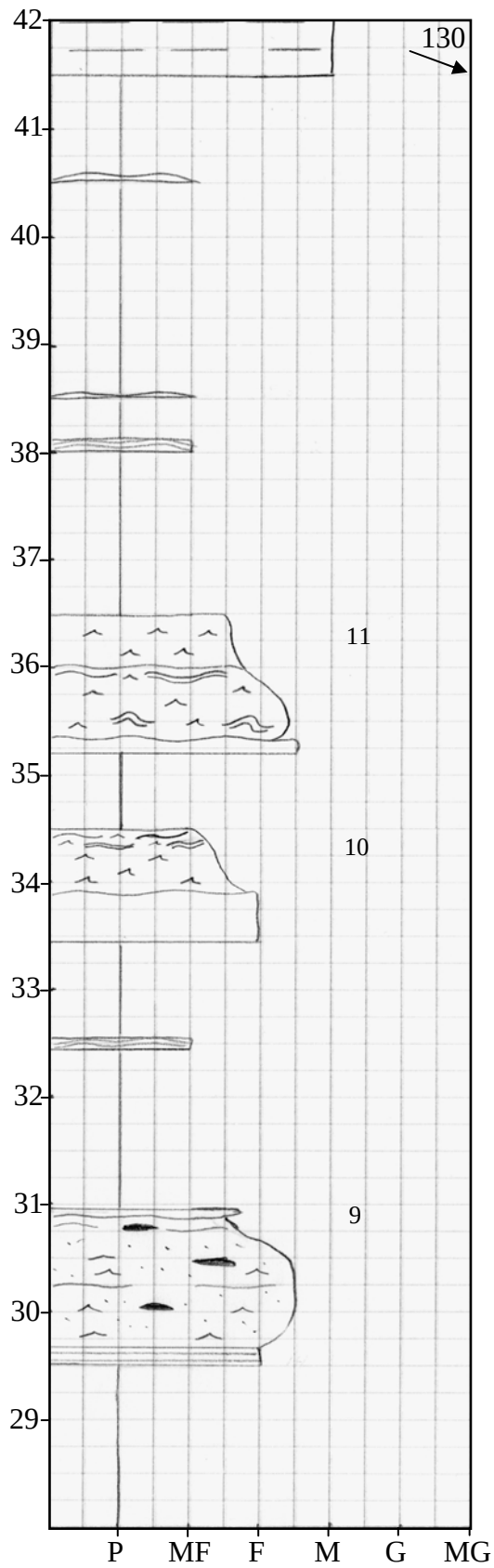


Figura 6- Mappa di localizzazione della sezione D, Valle del Bidente.

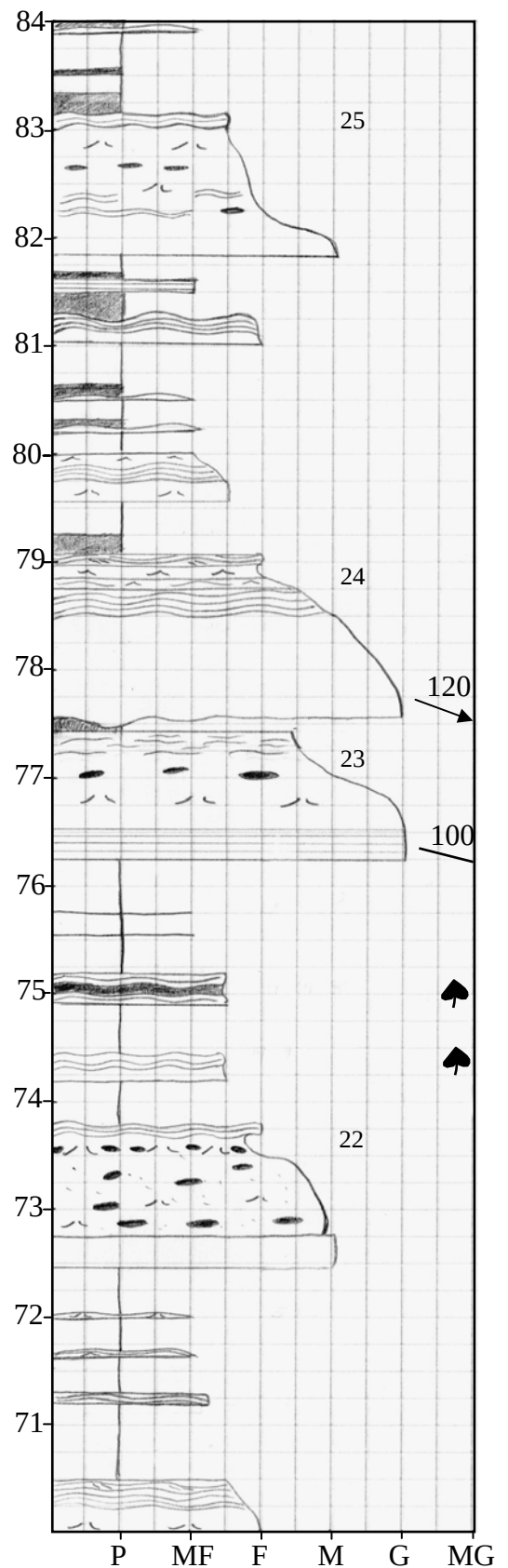
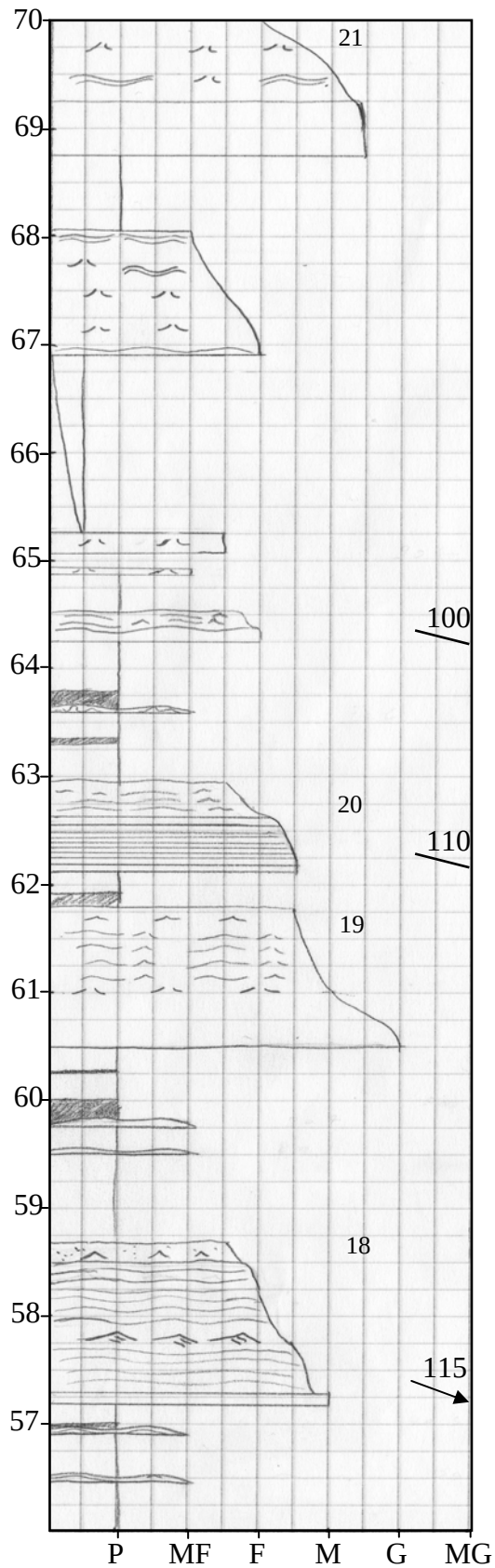
Sezione D



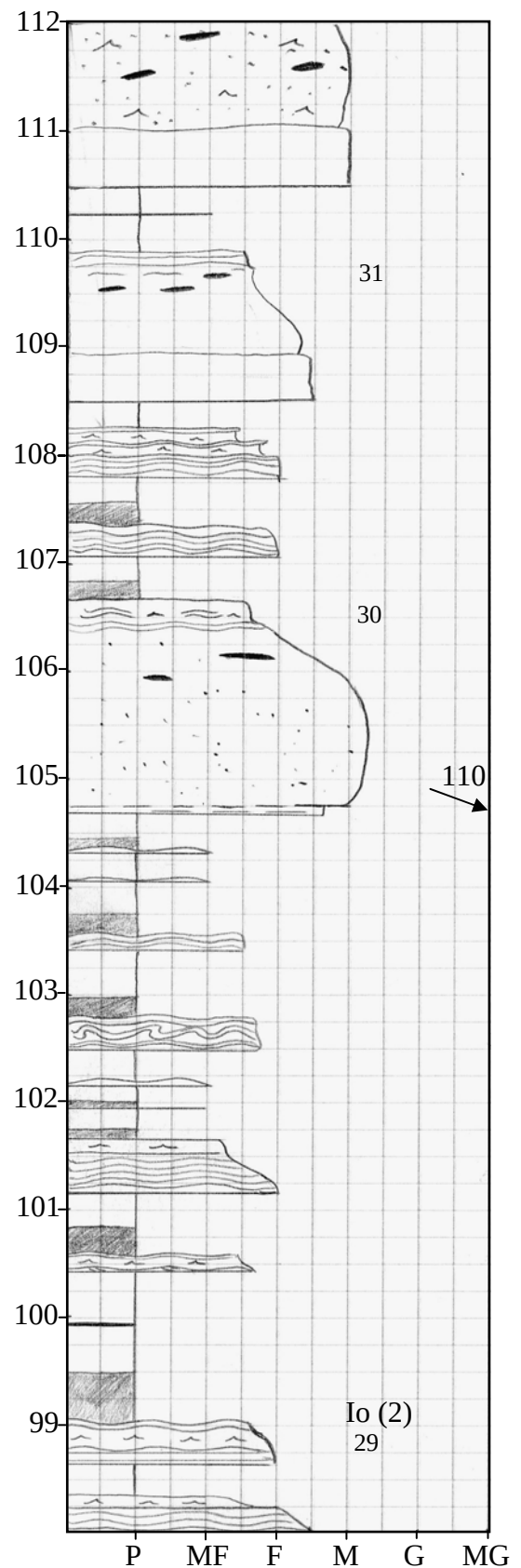
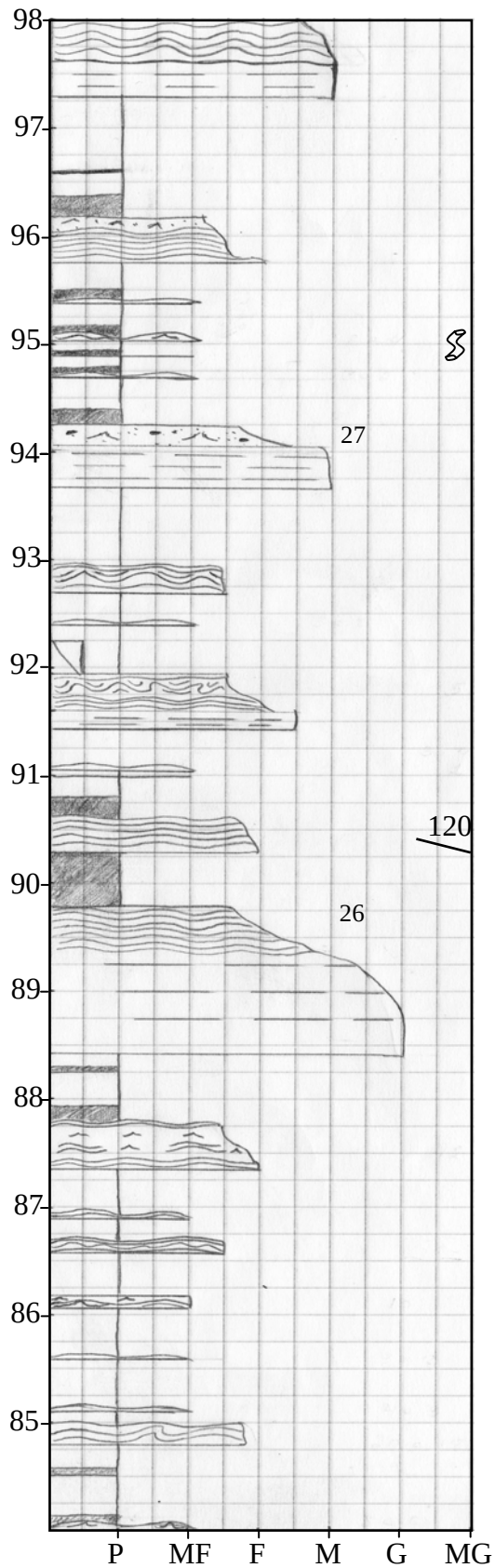
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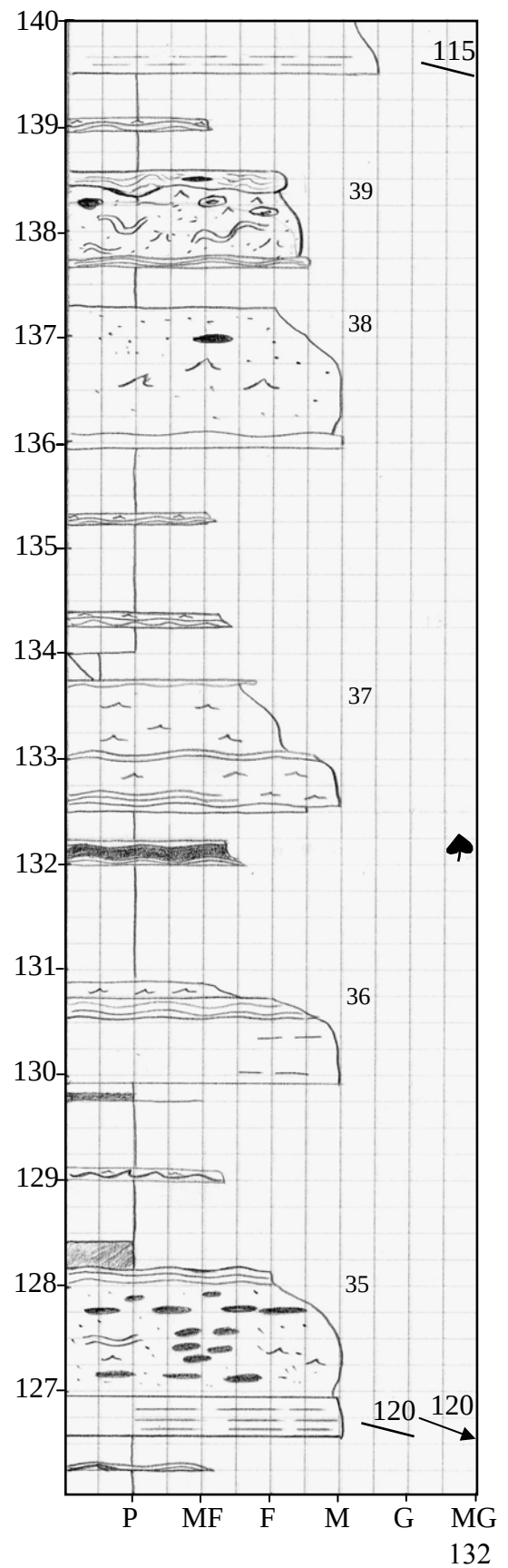
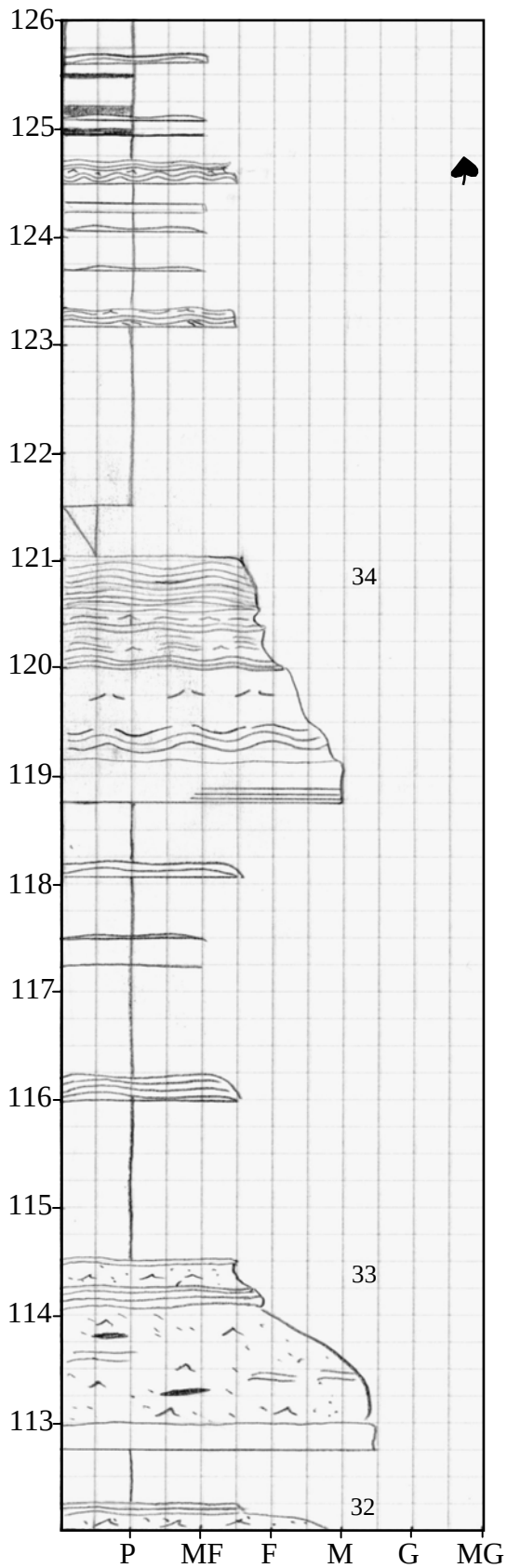
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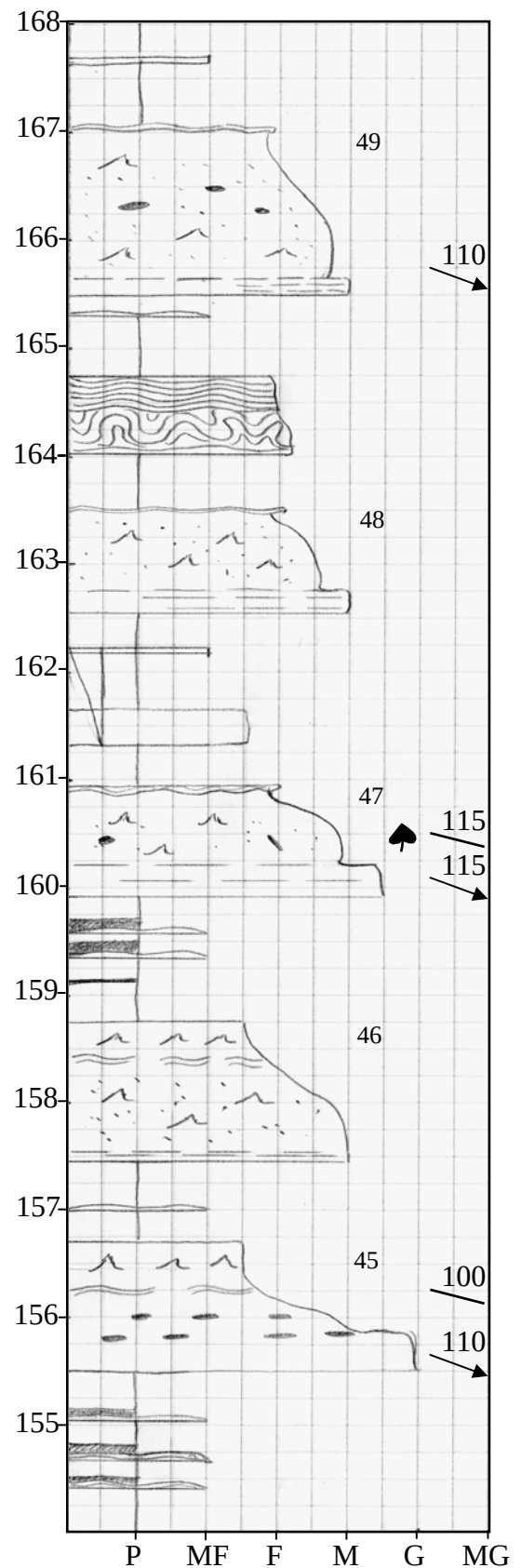
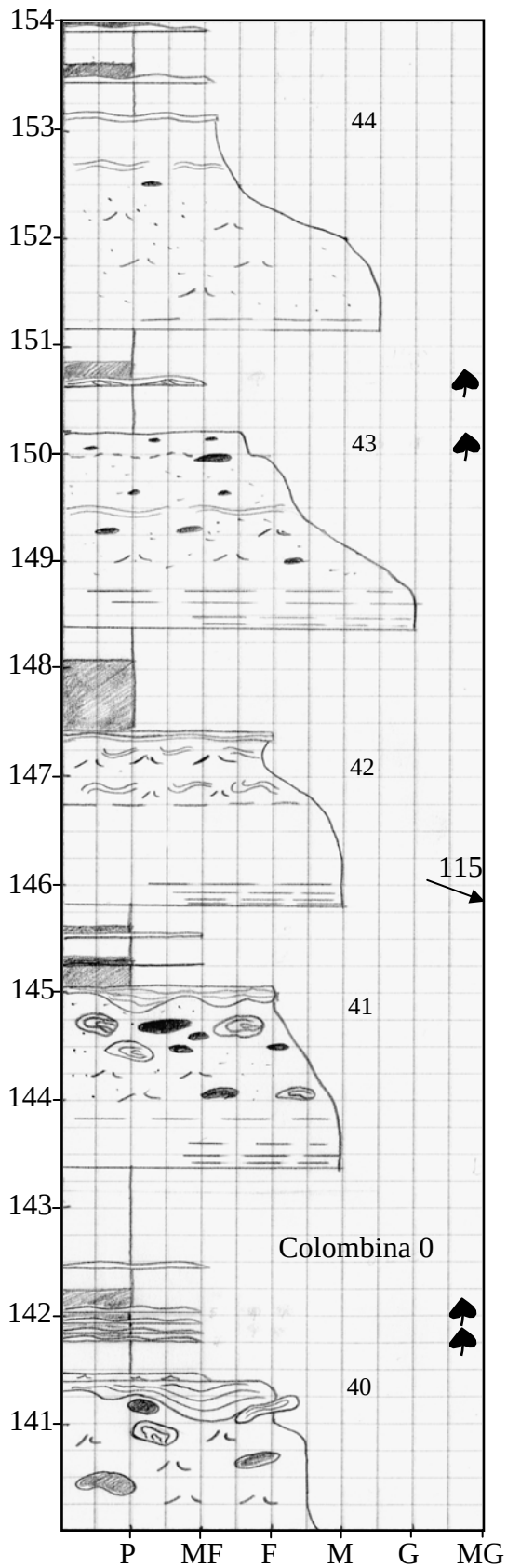
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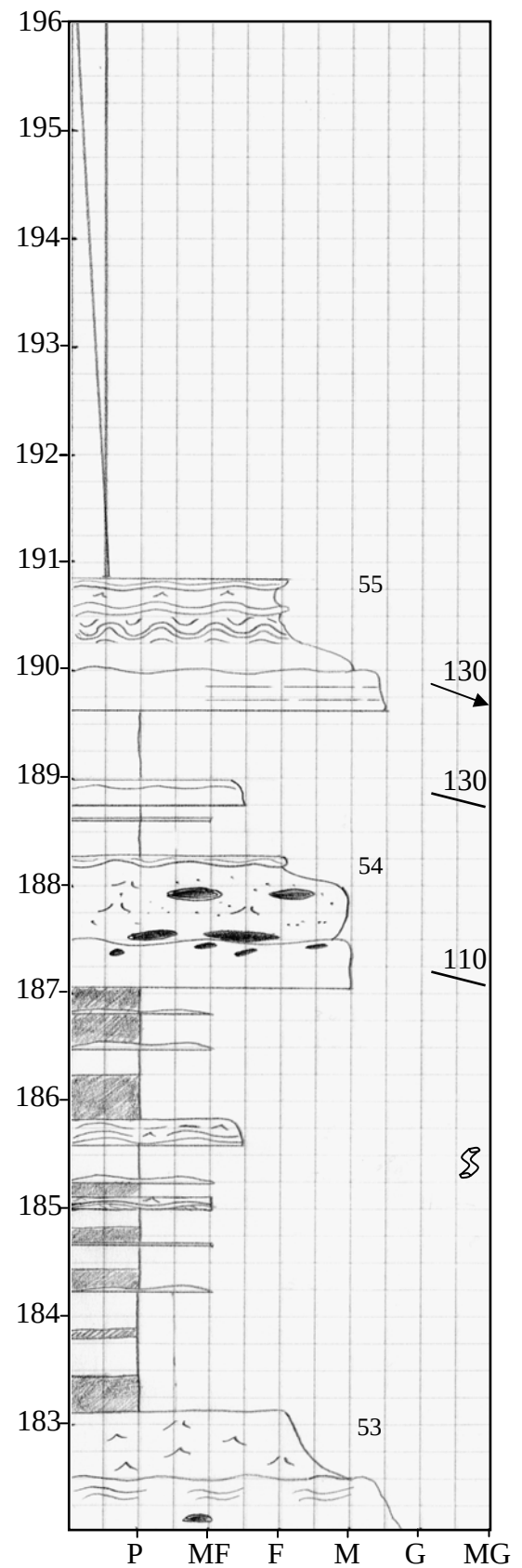
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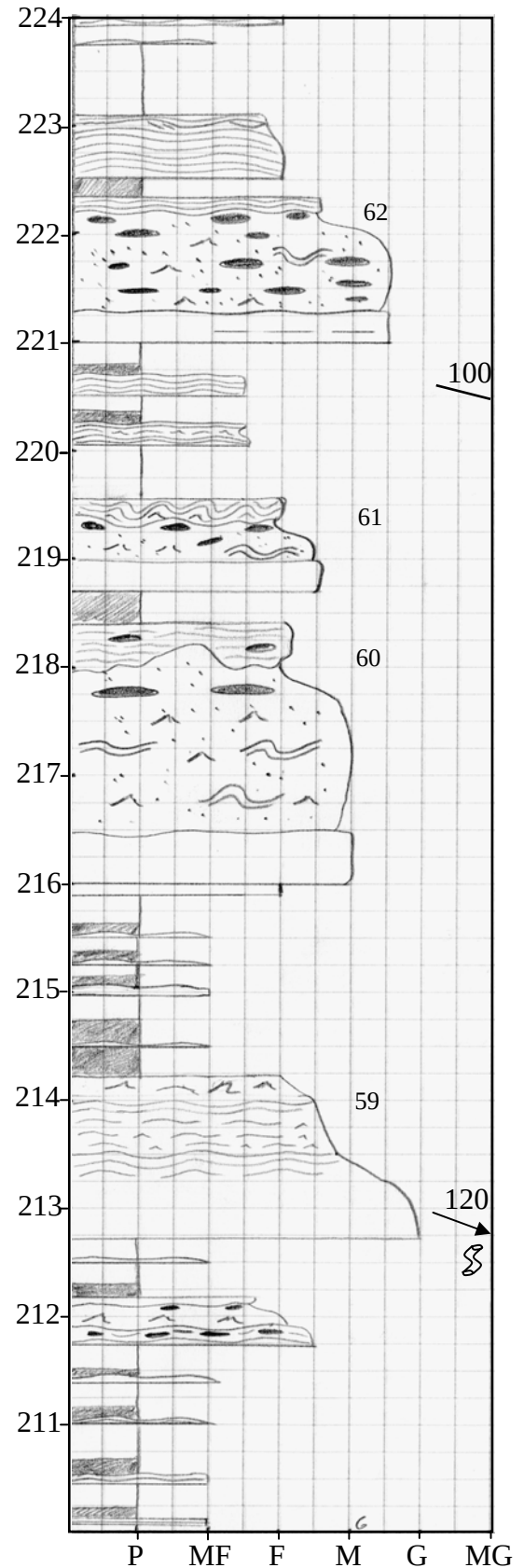
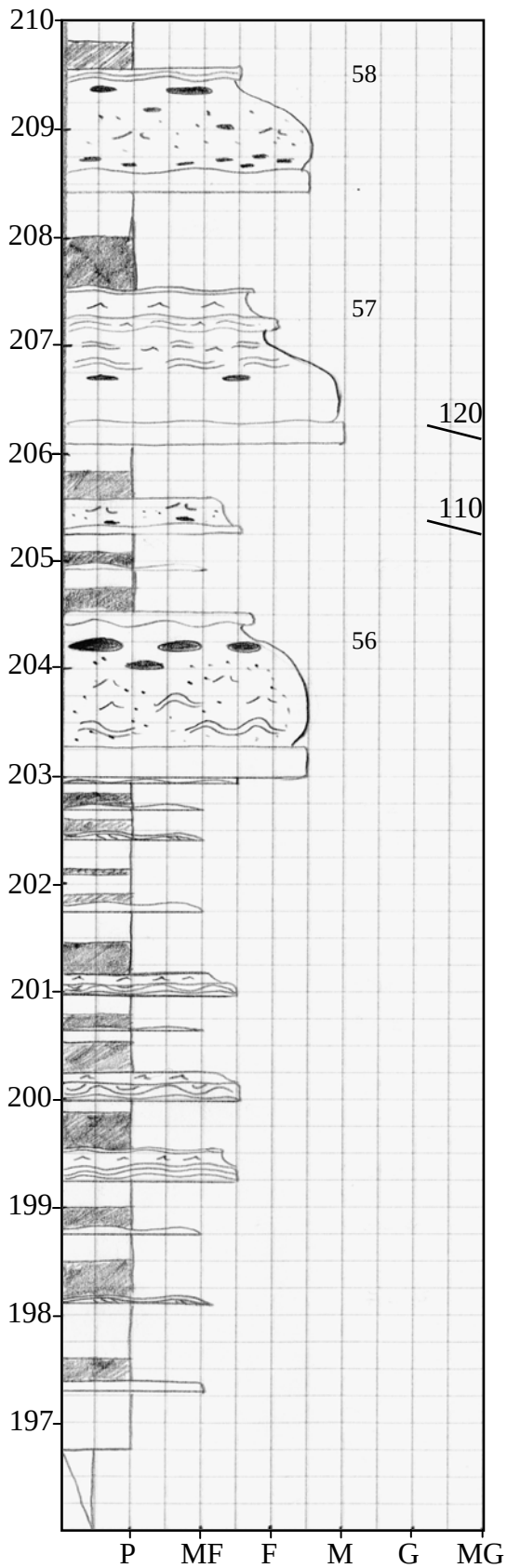
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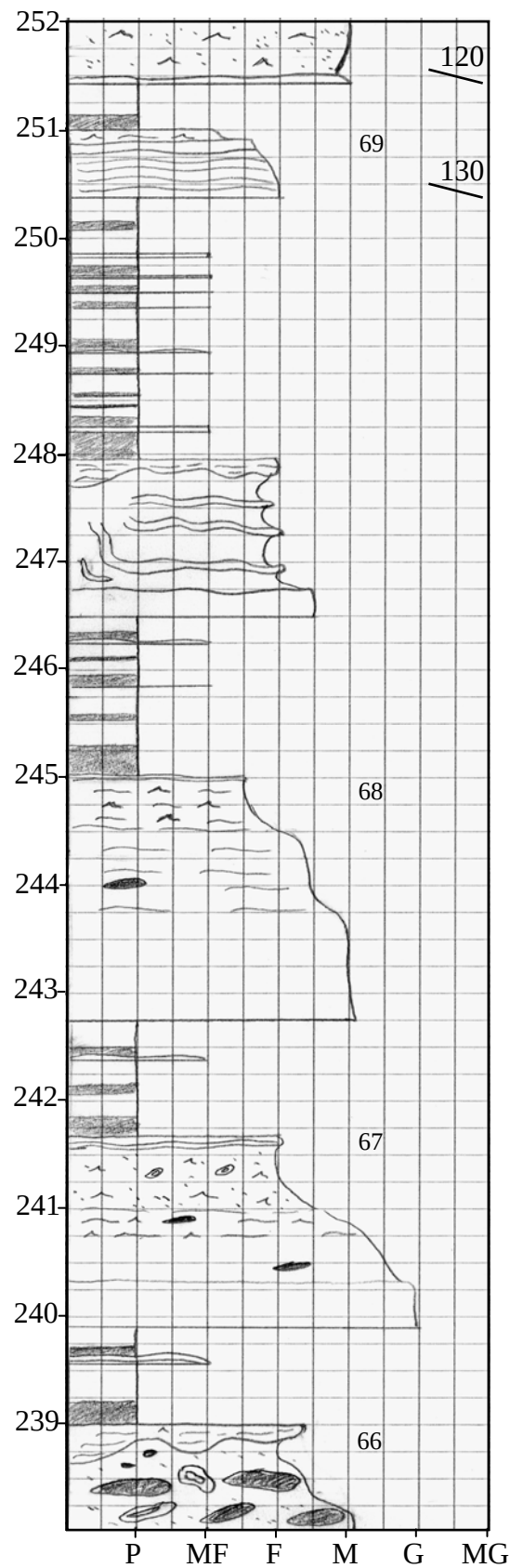
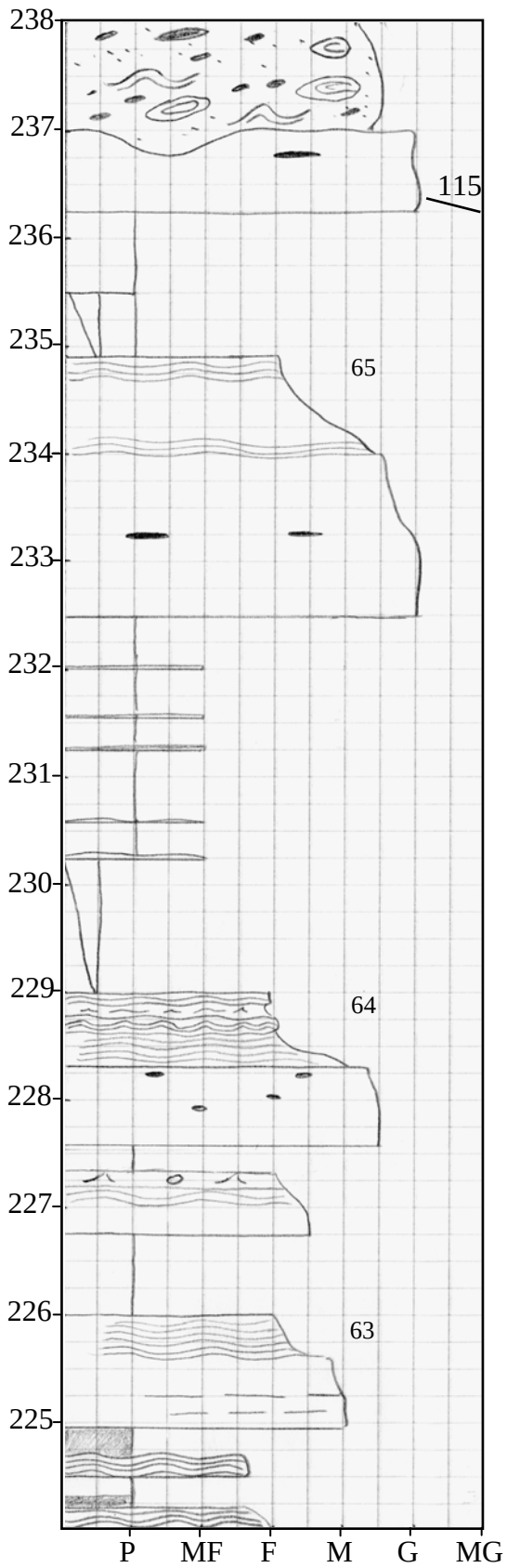
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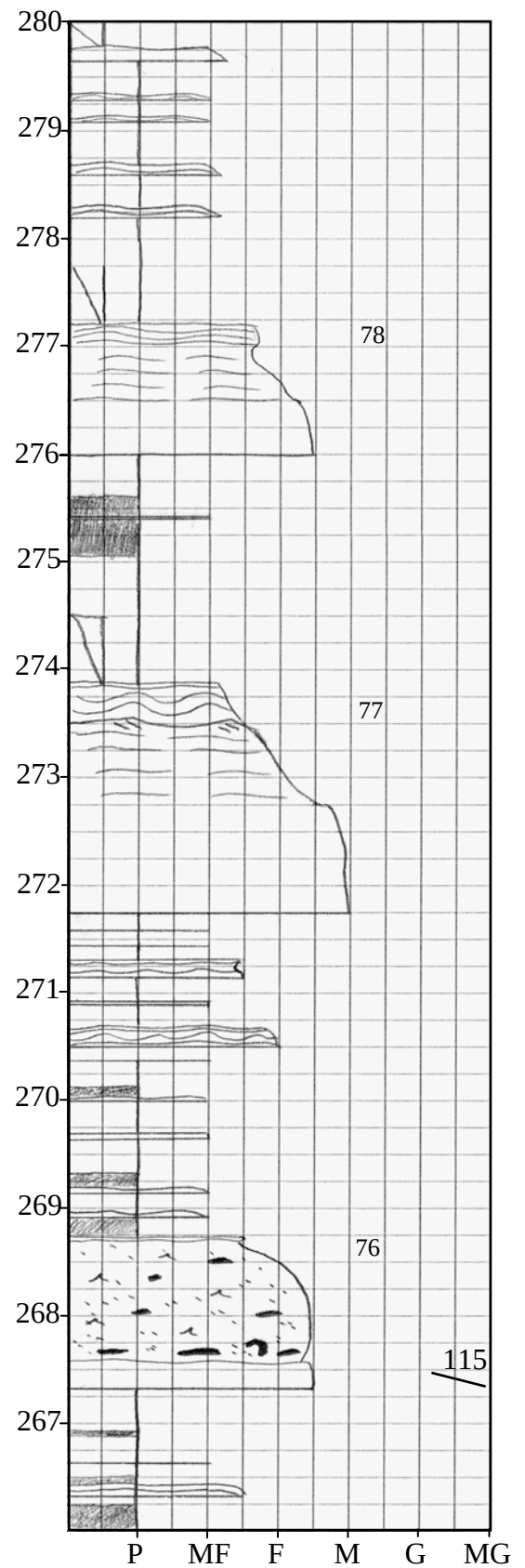
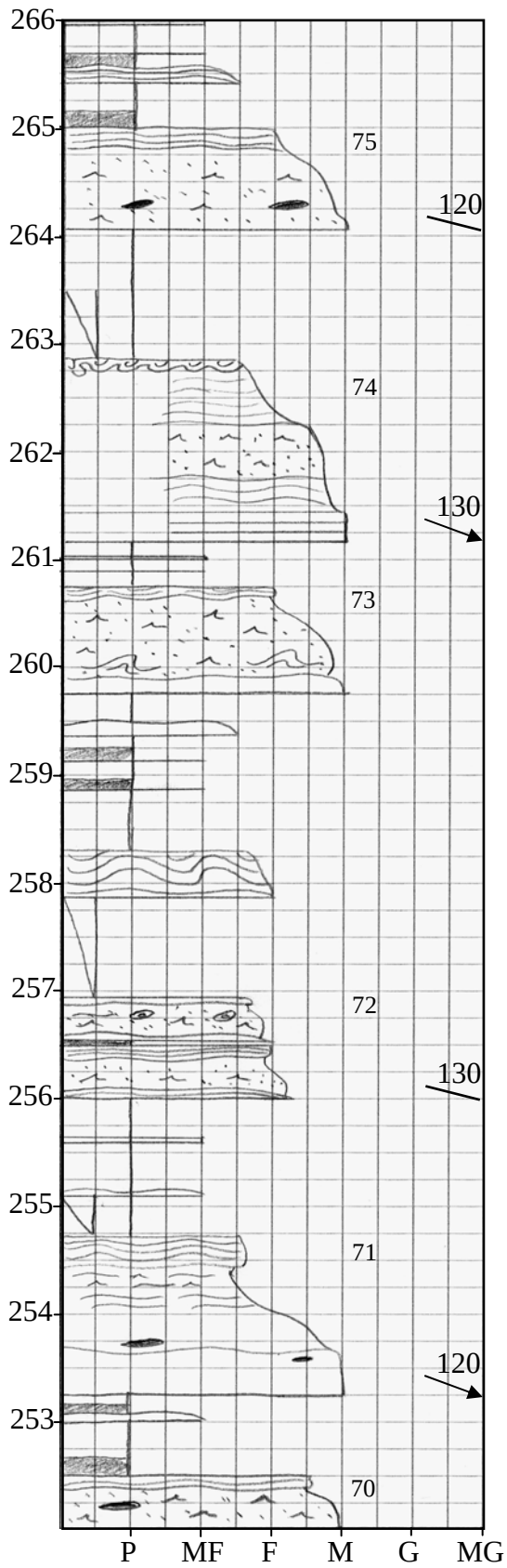
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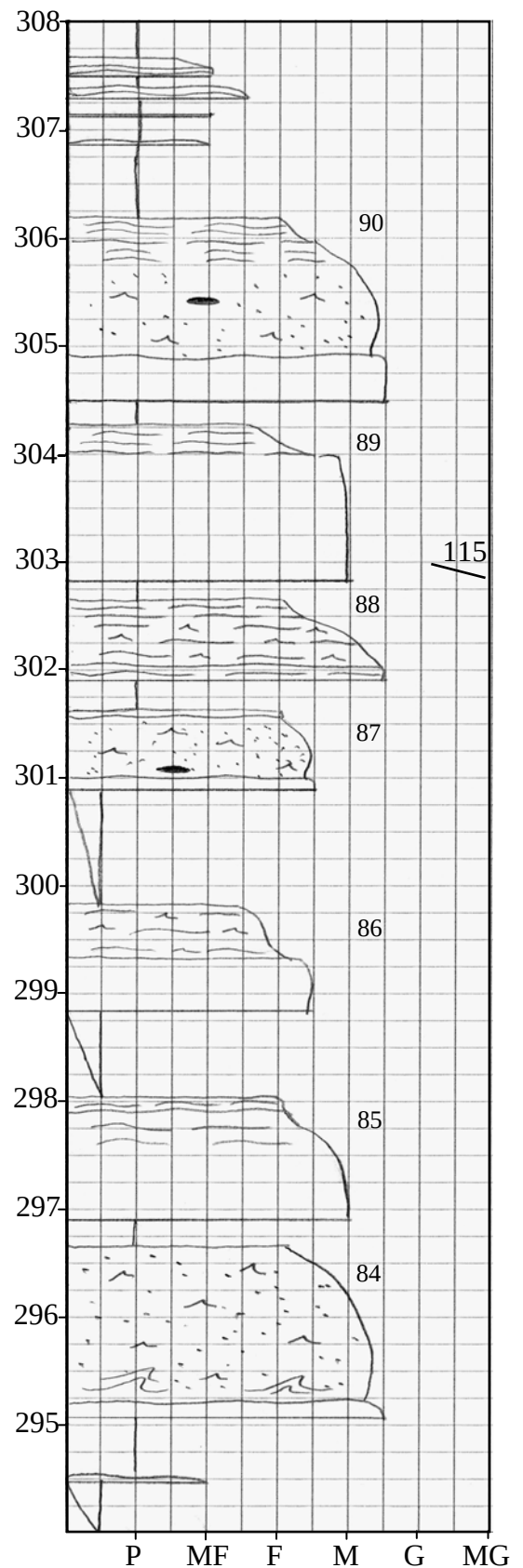
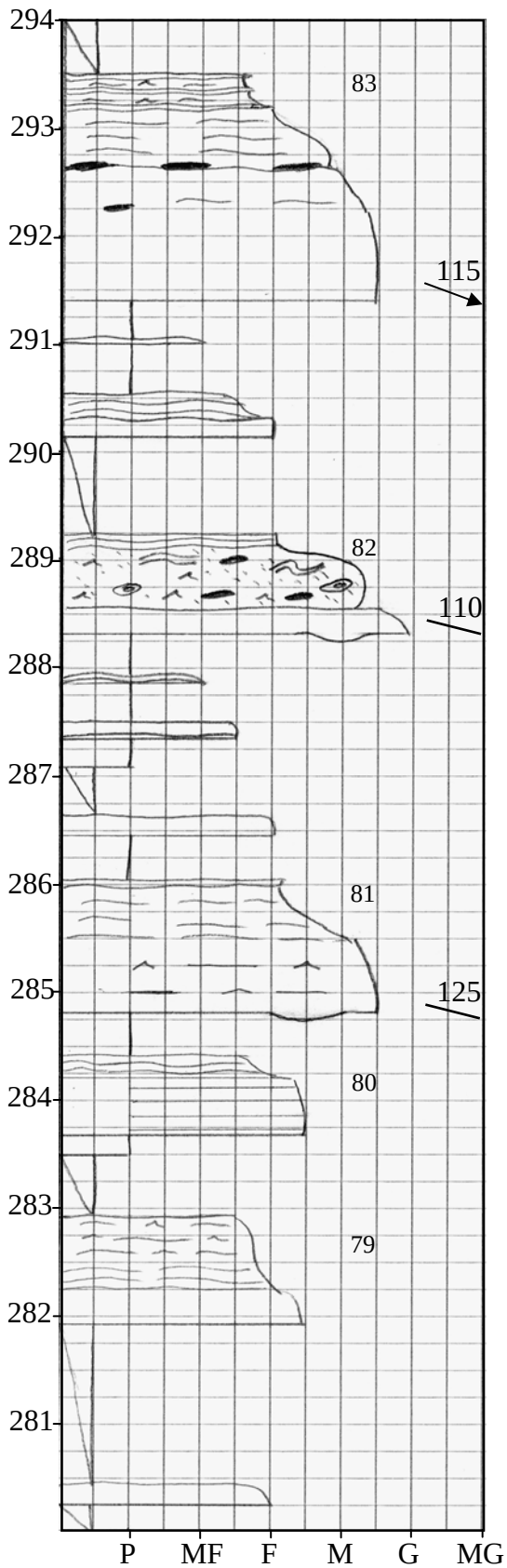
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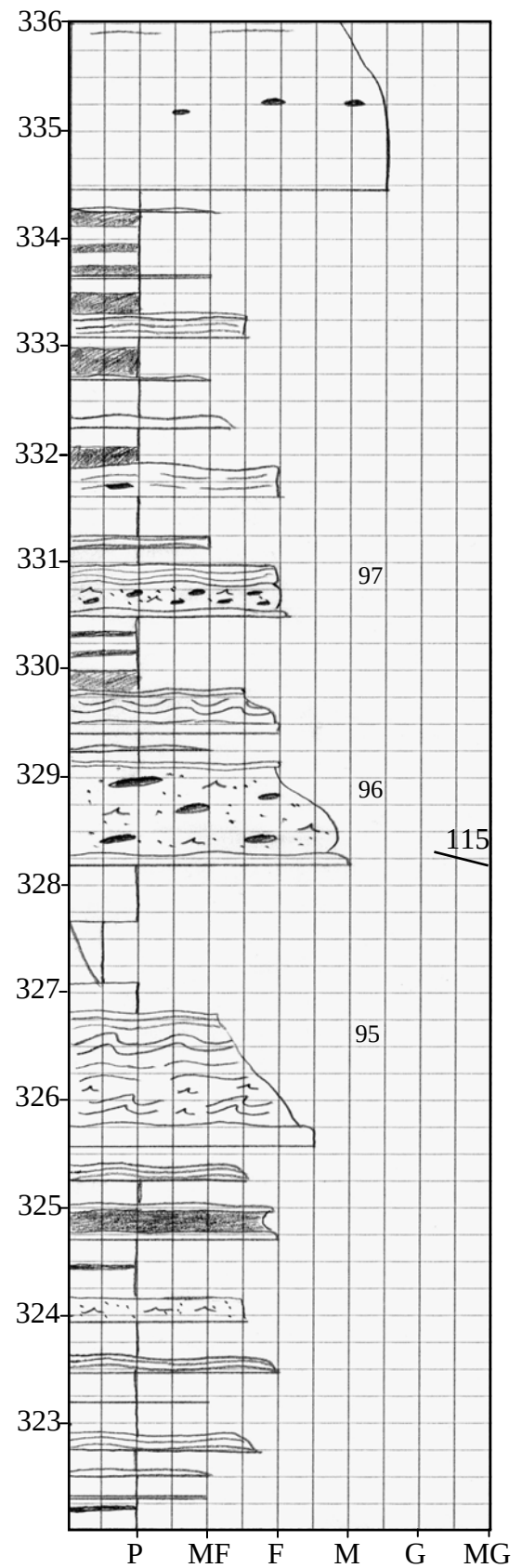
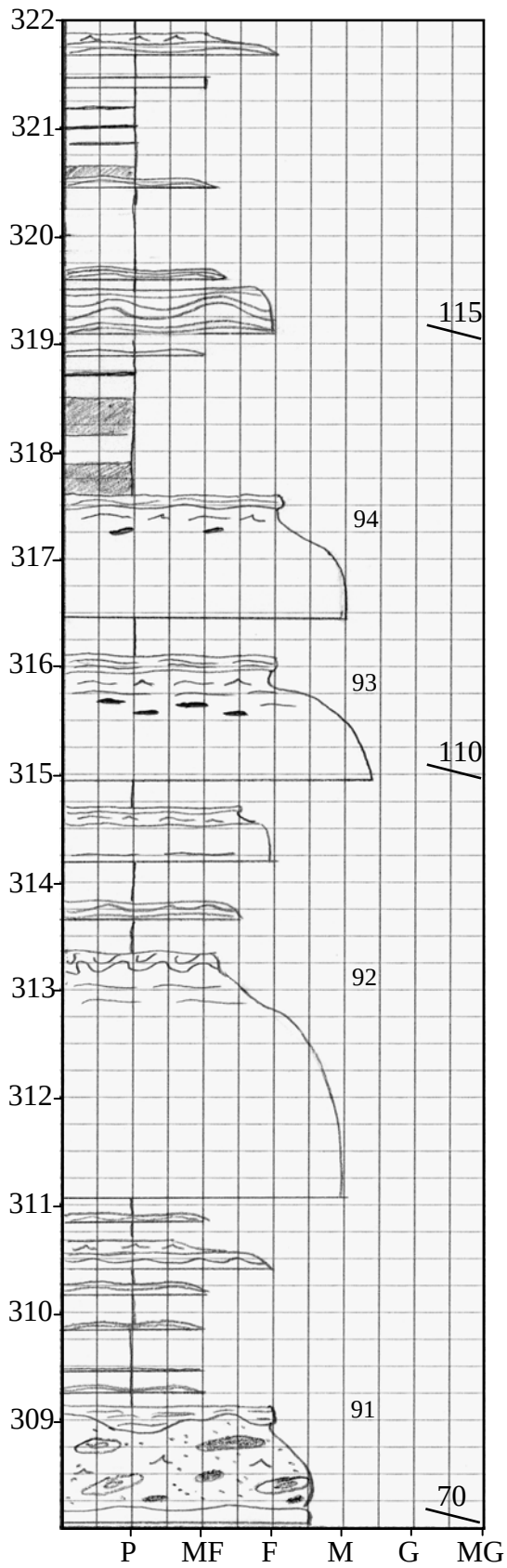
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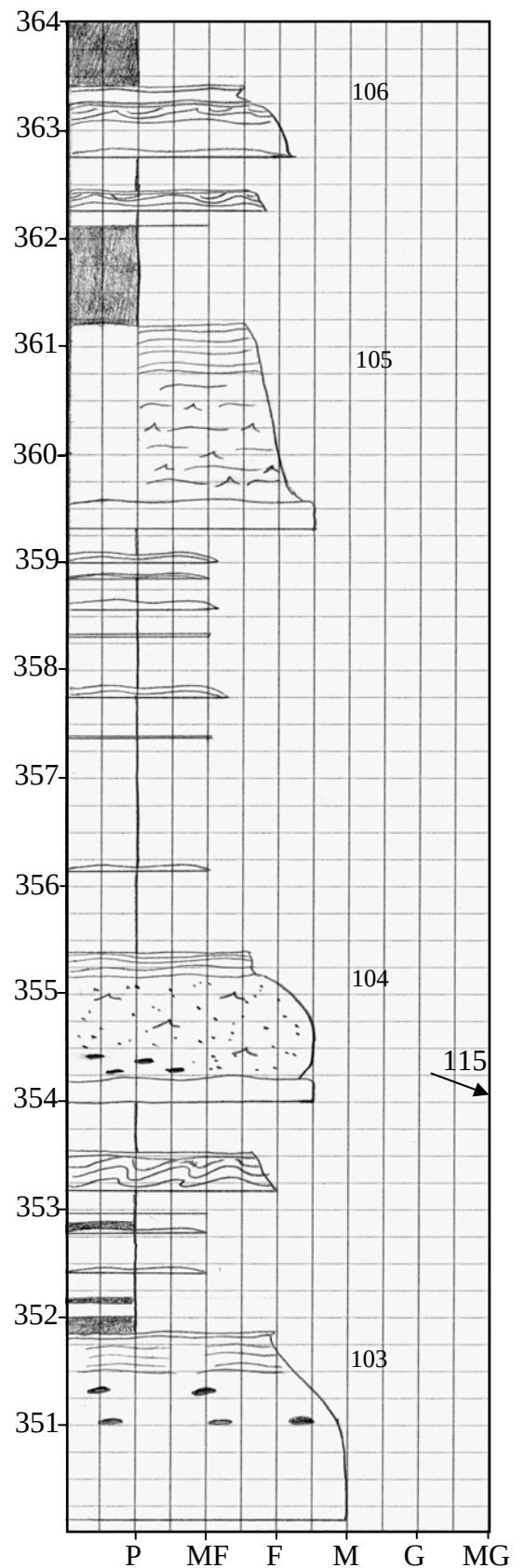
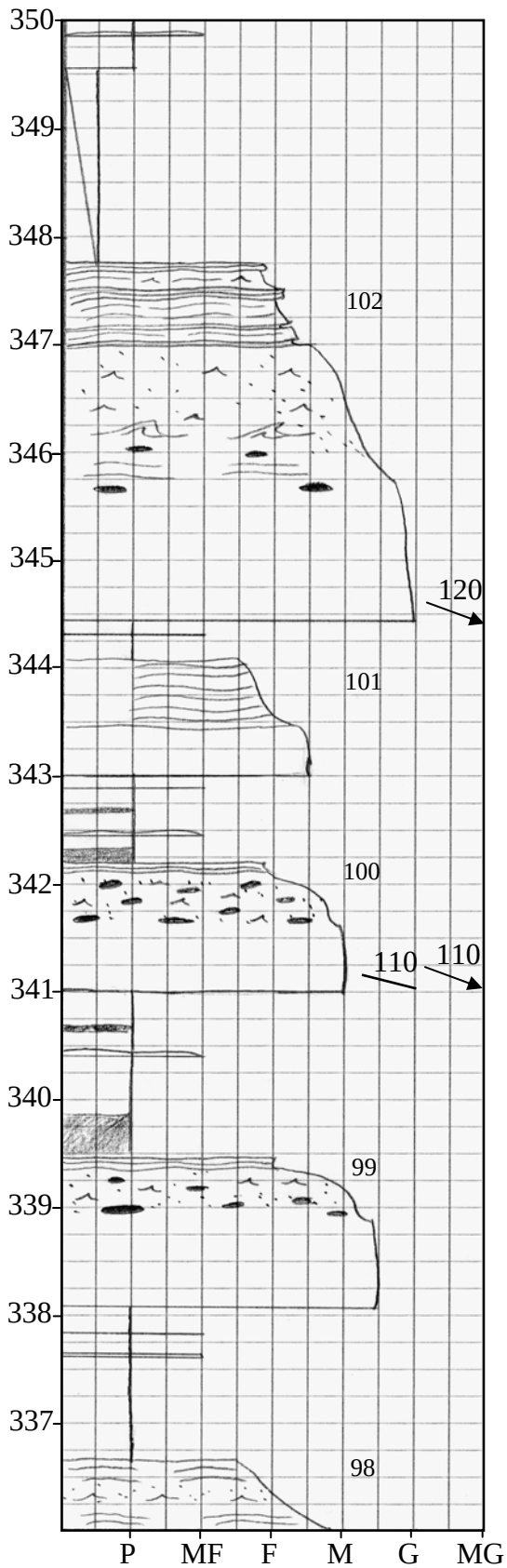
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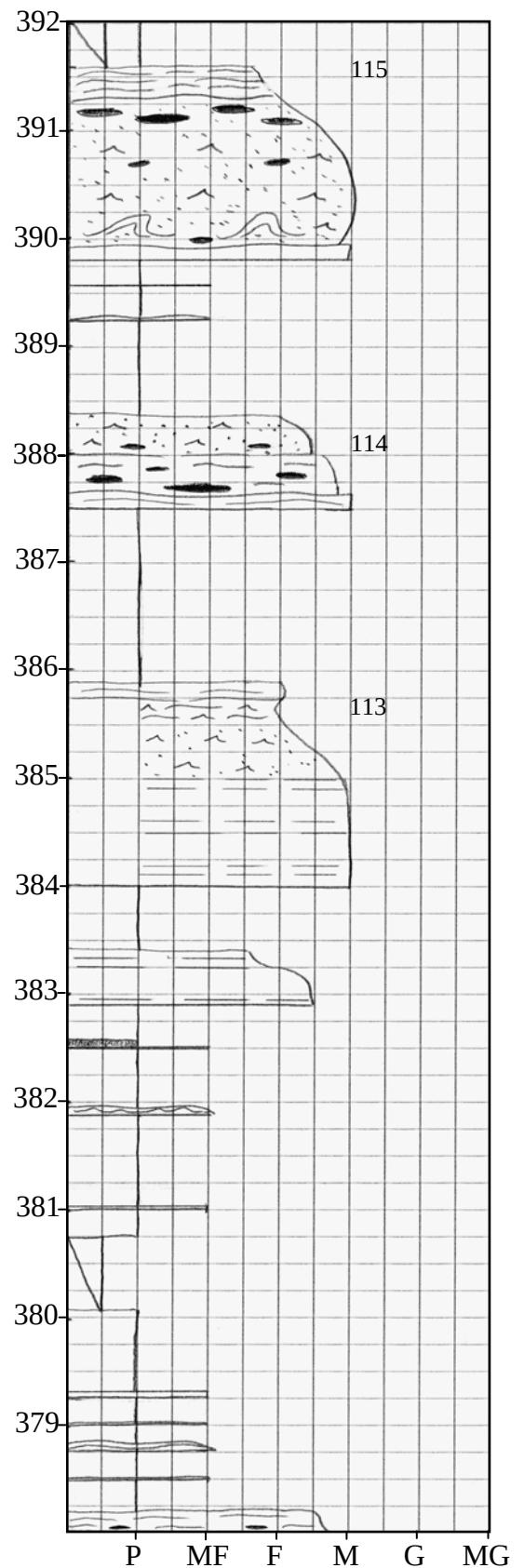
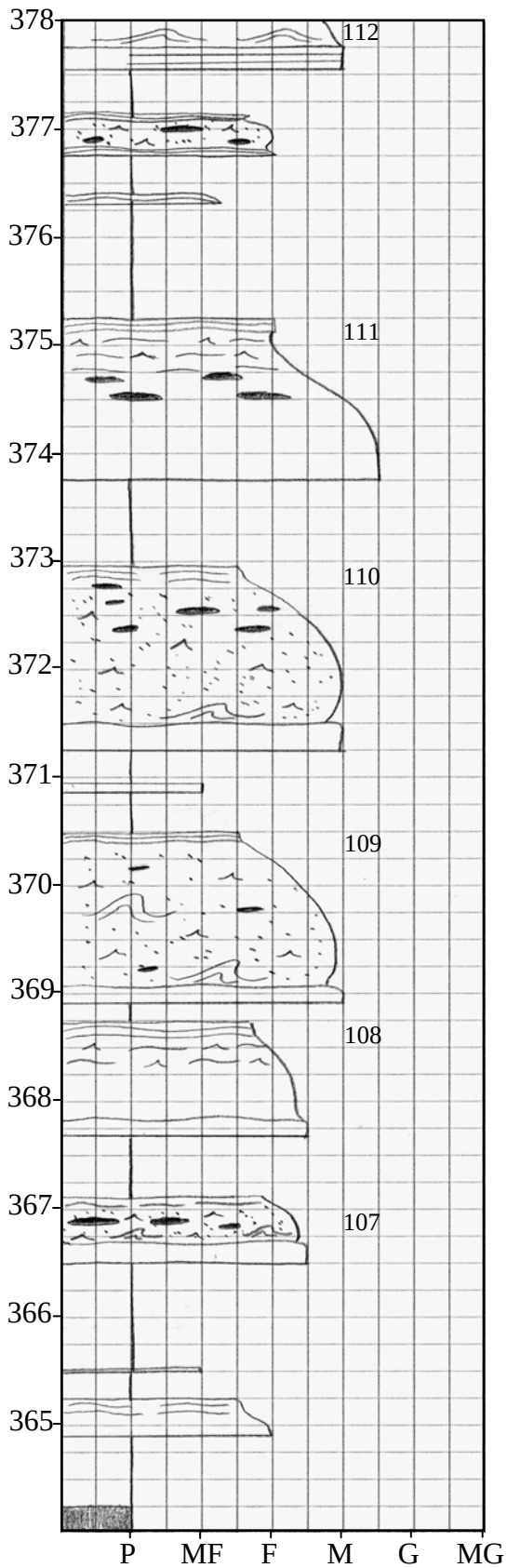
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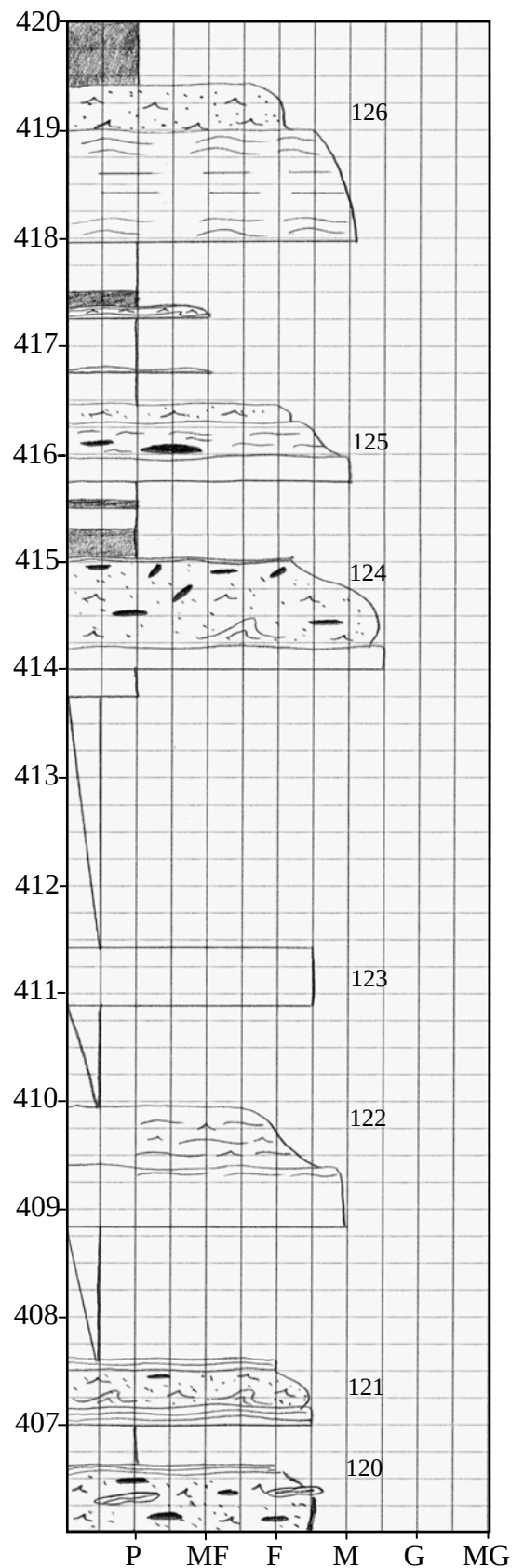
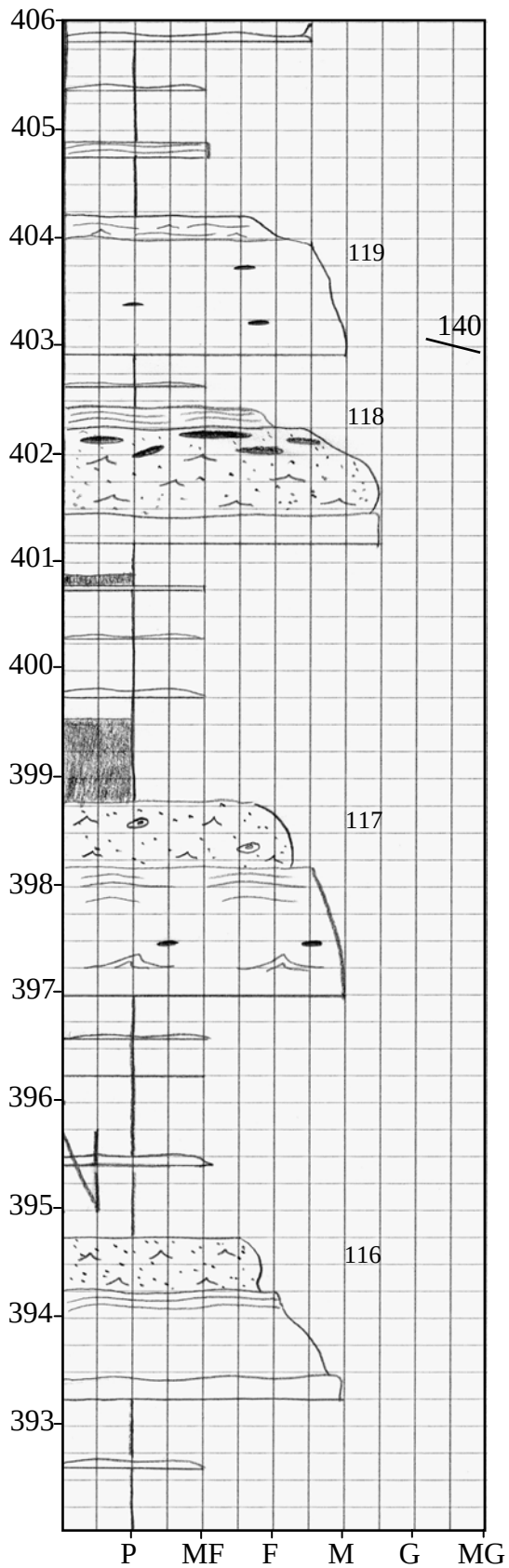
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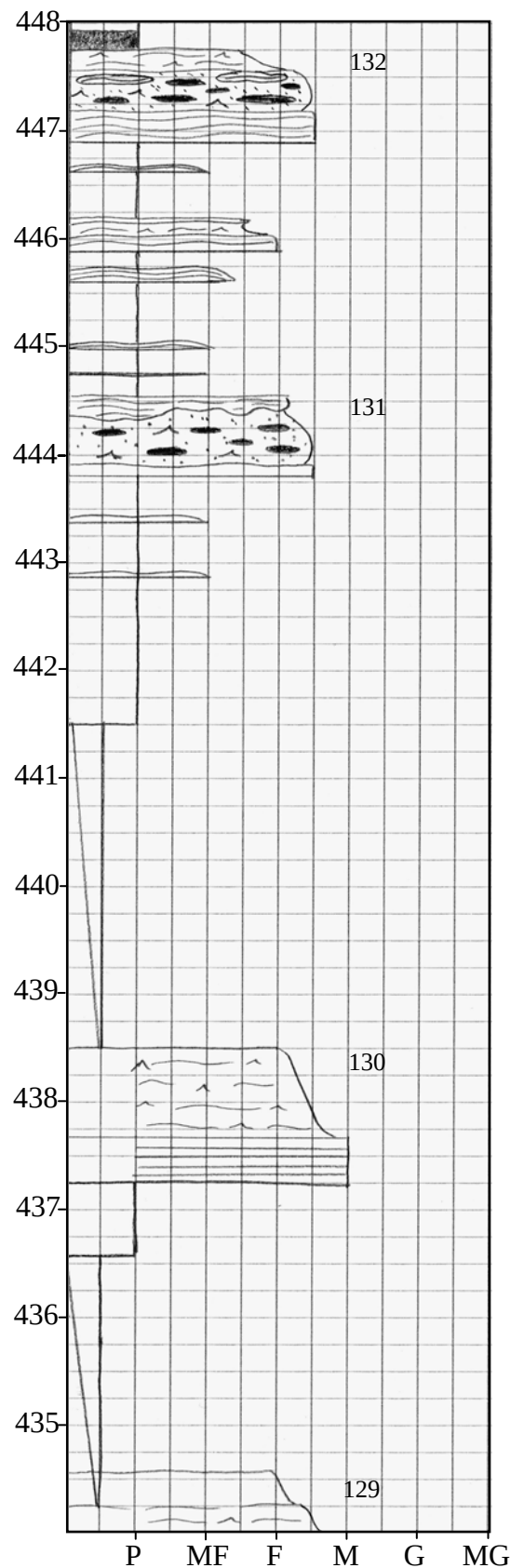
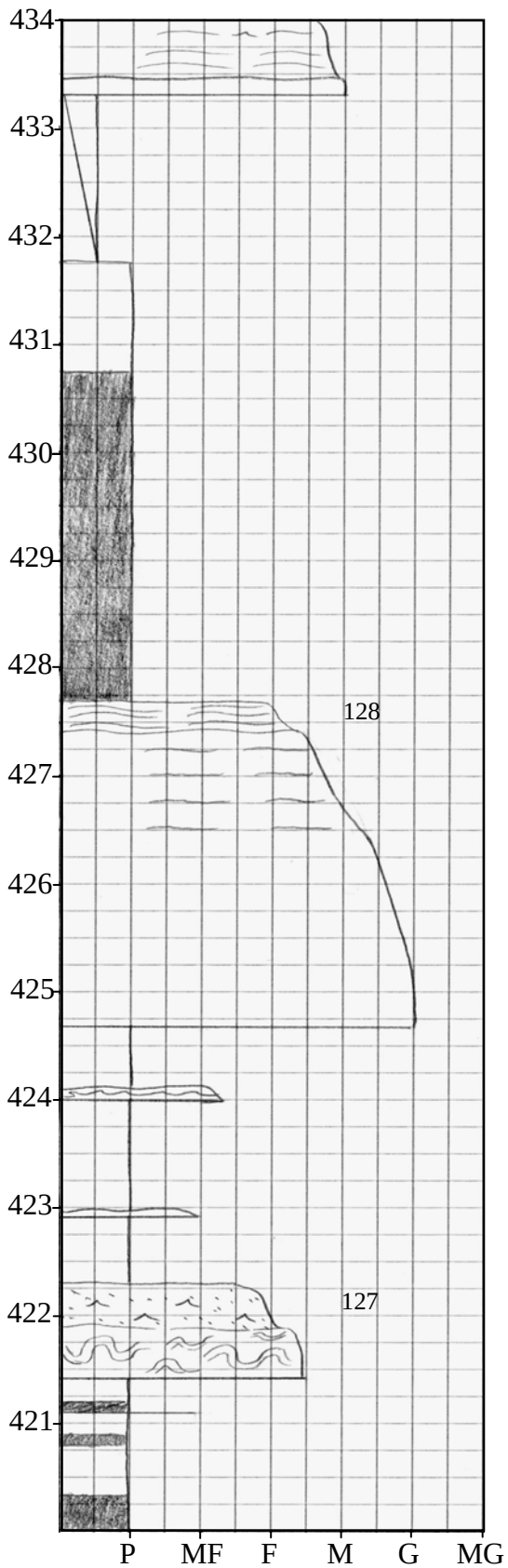
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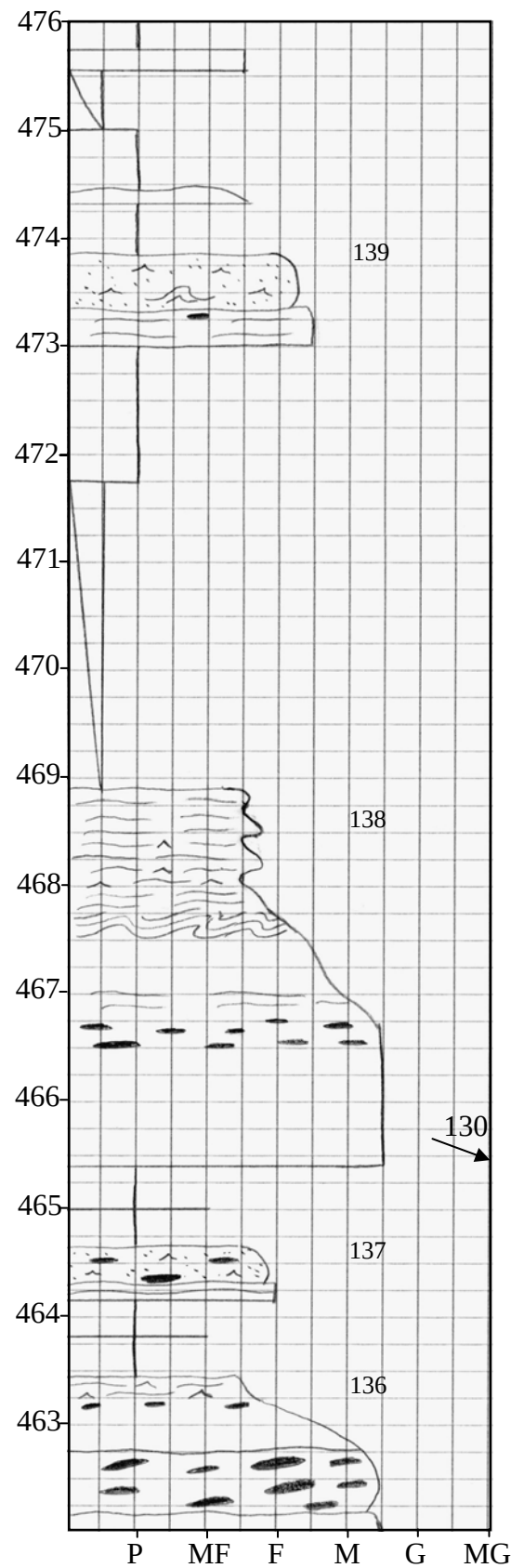
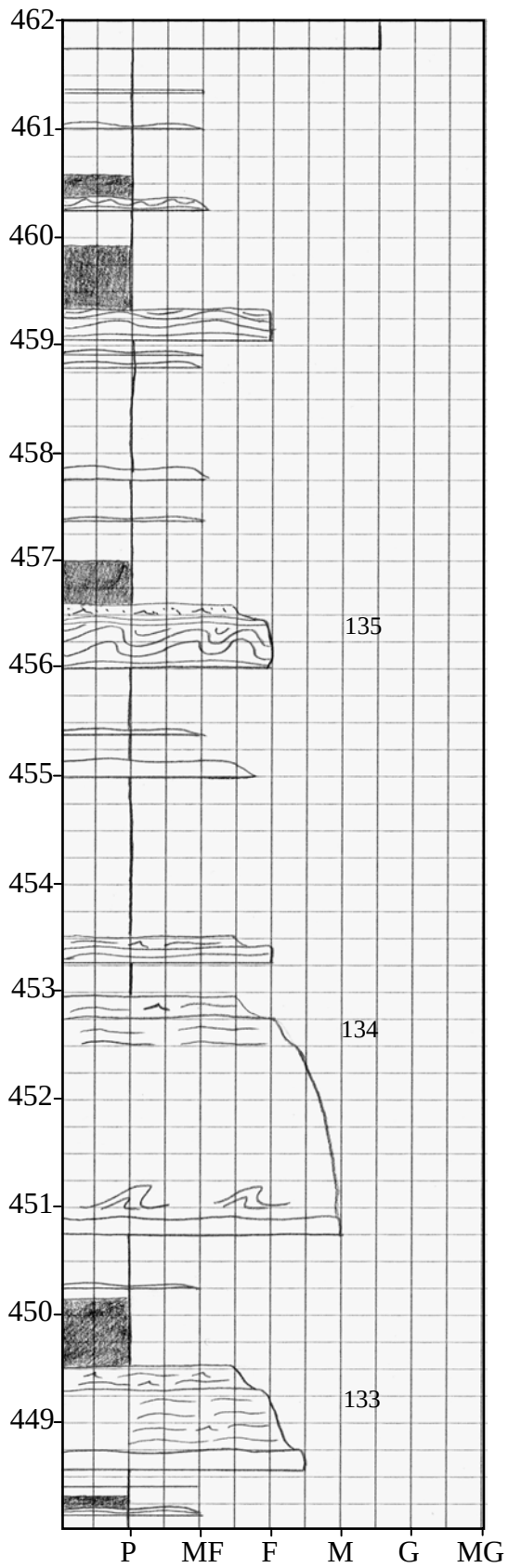
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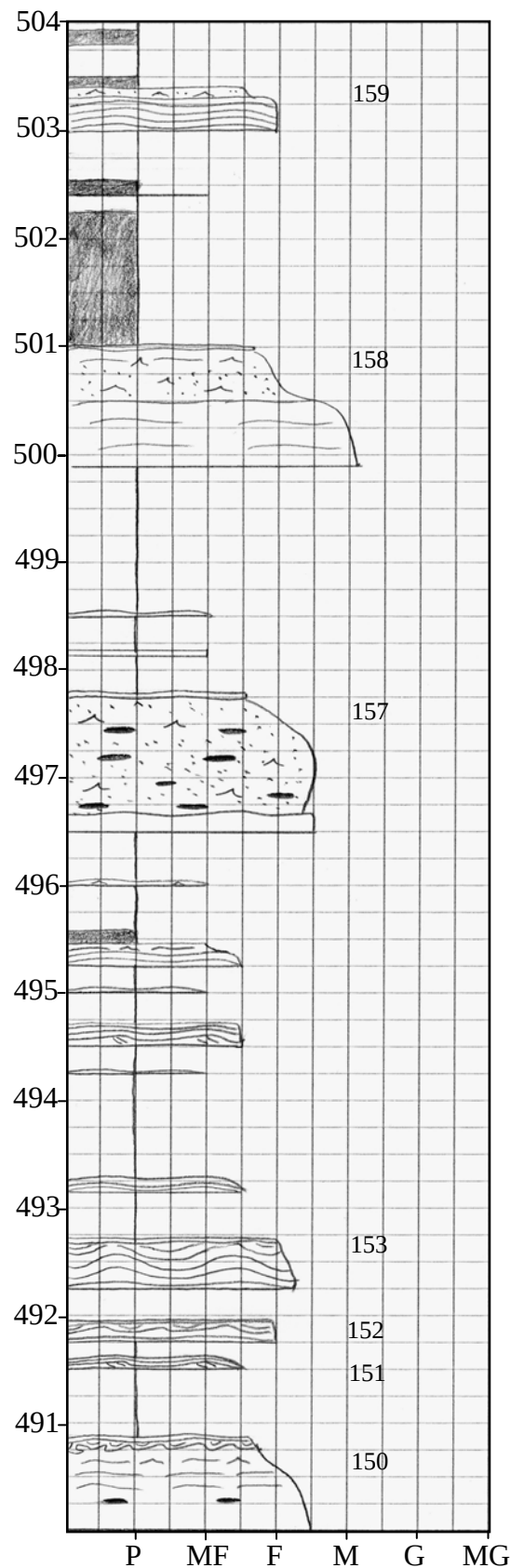
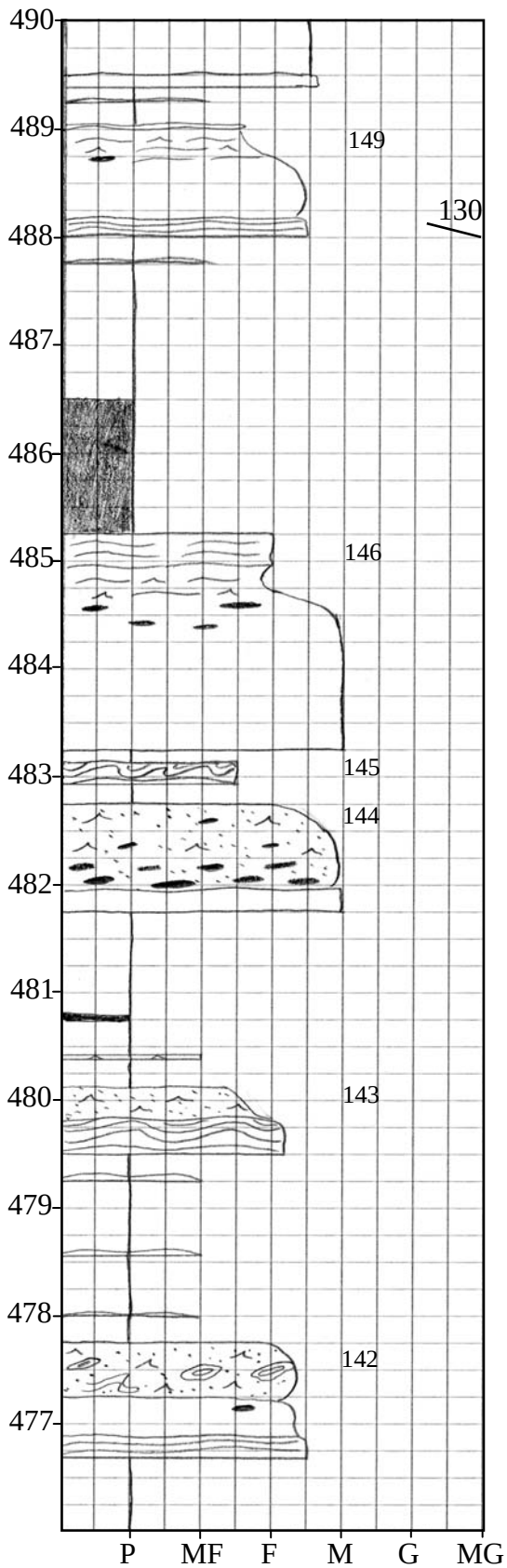
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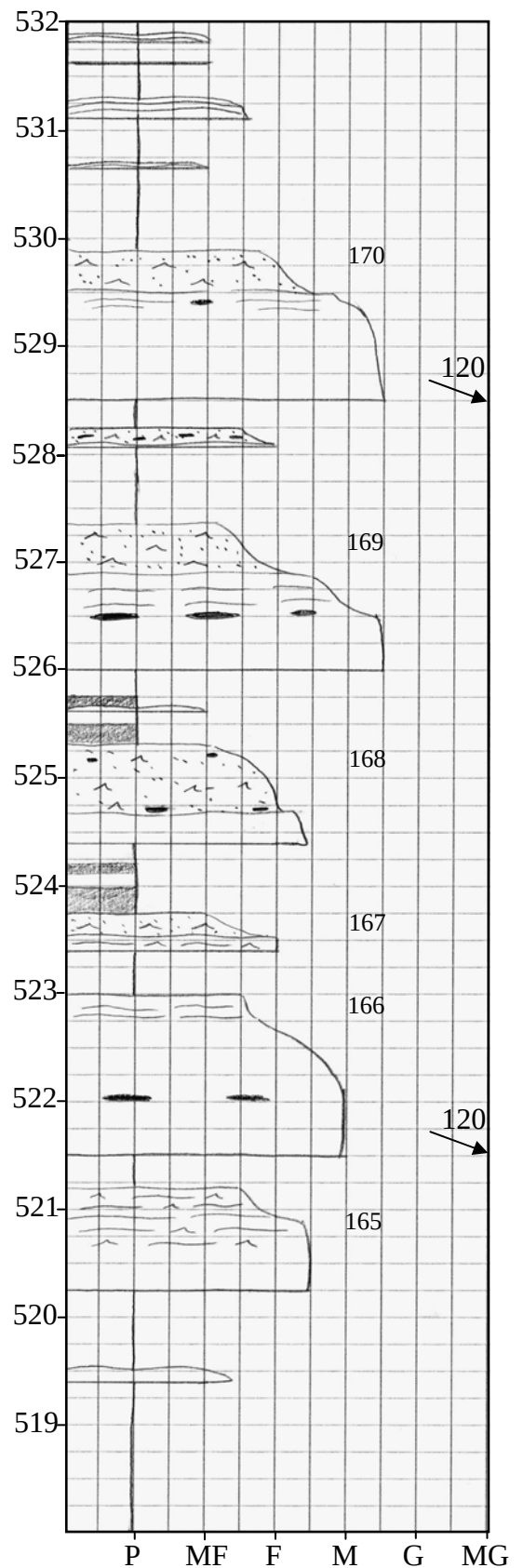
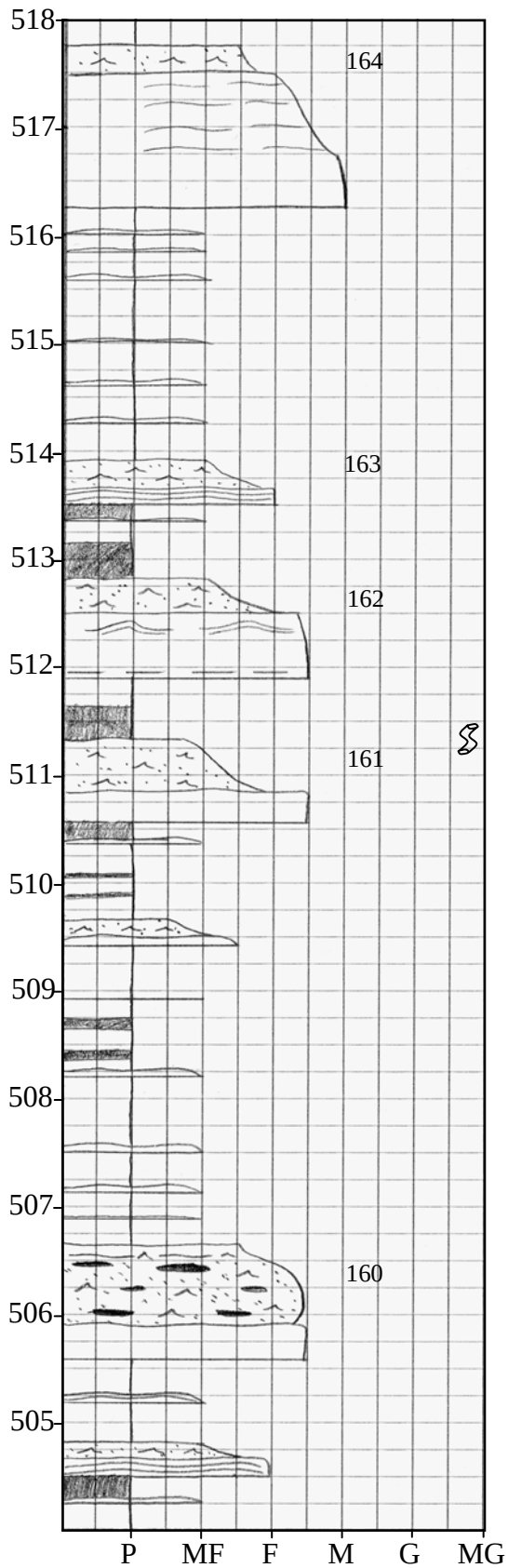
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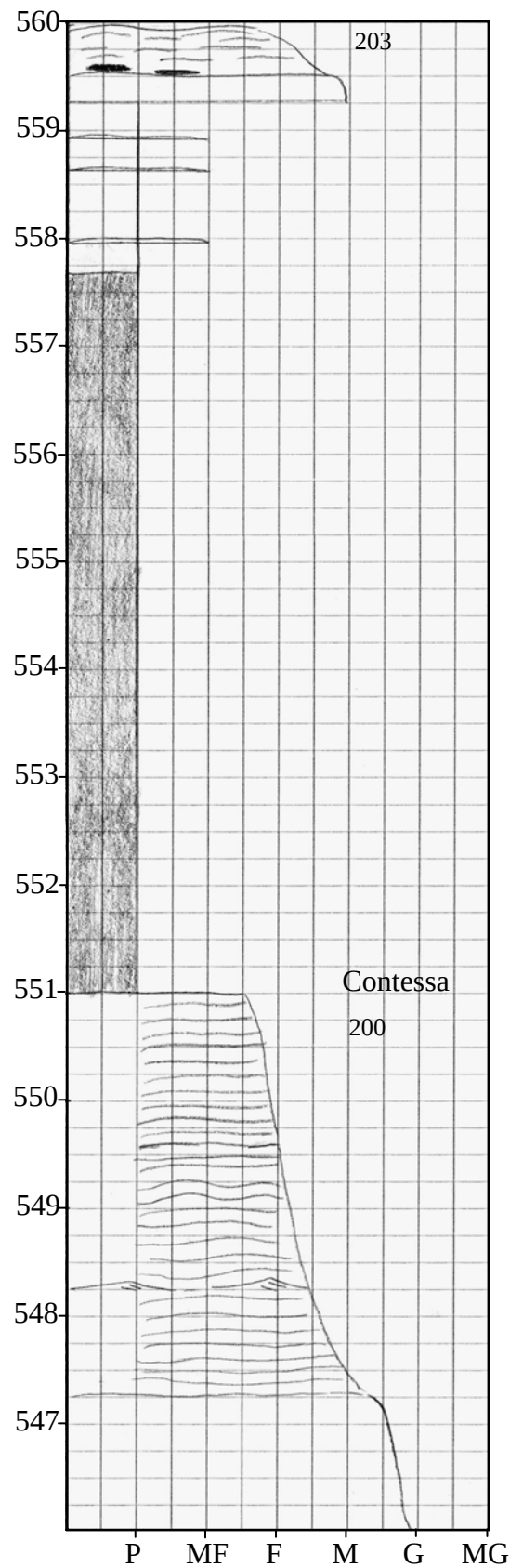
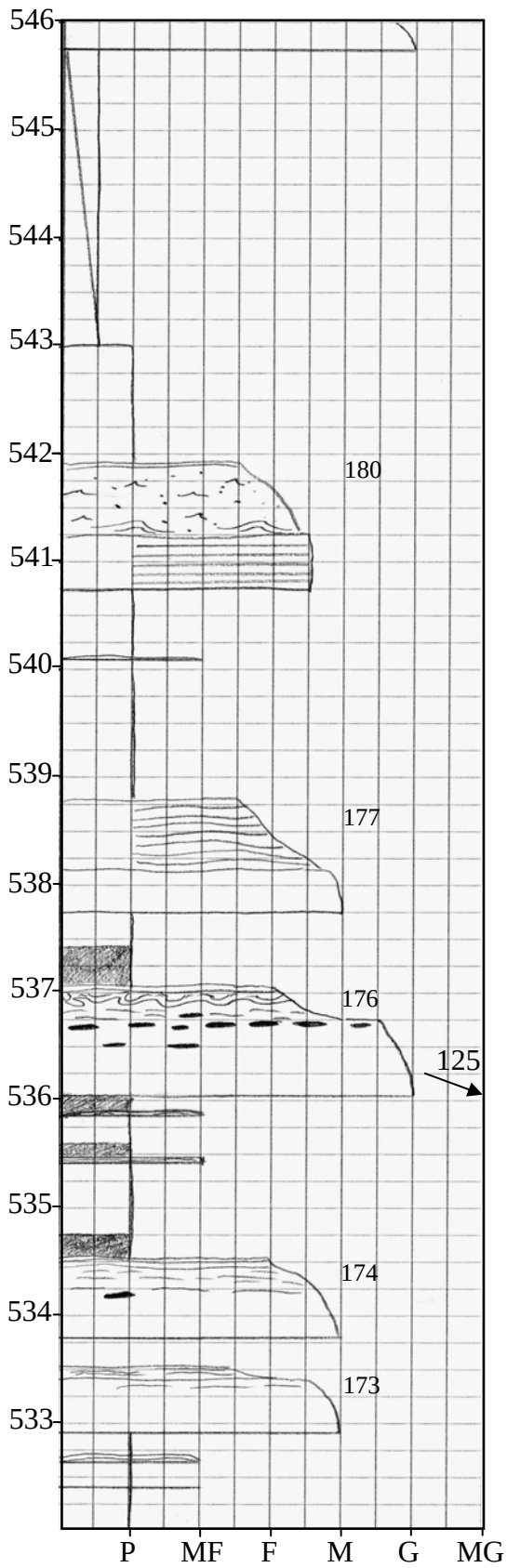
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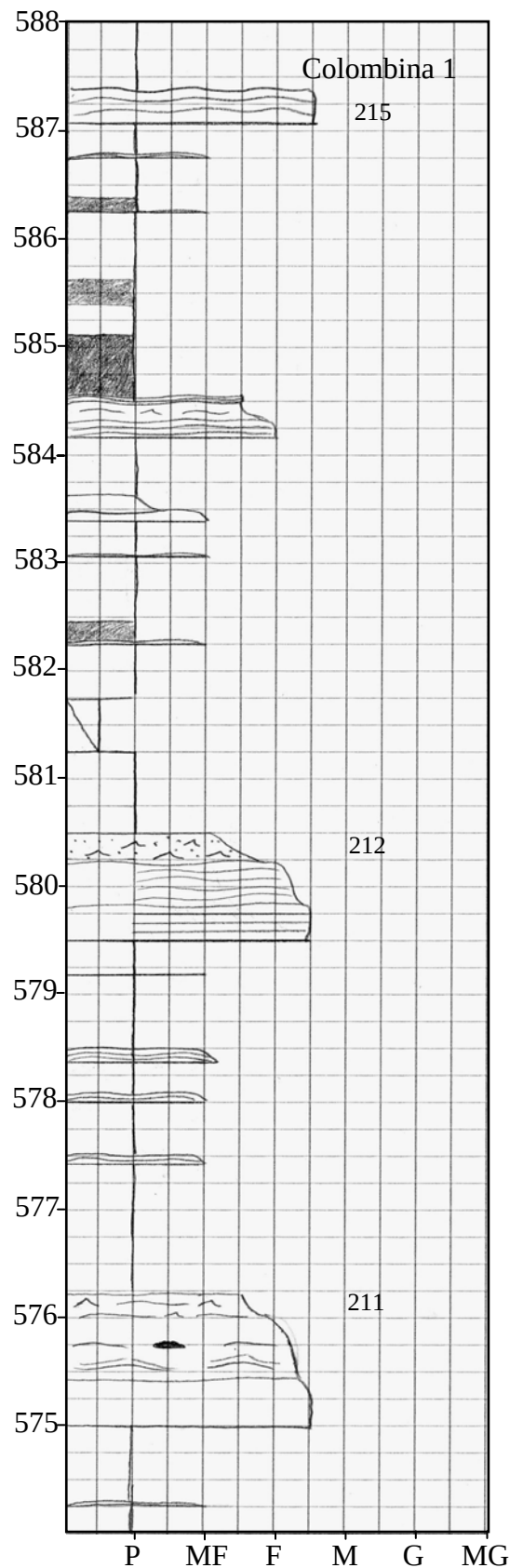
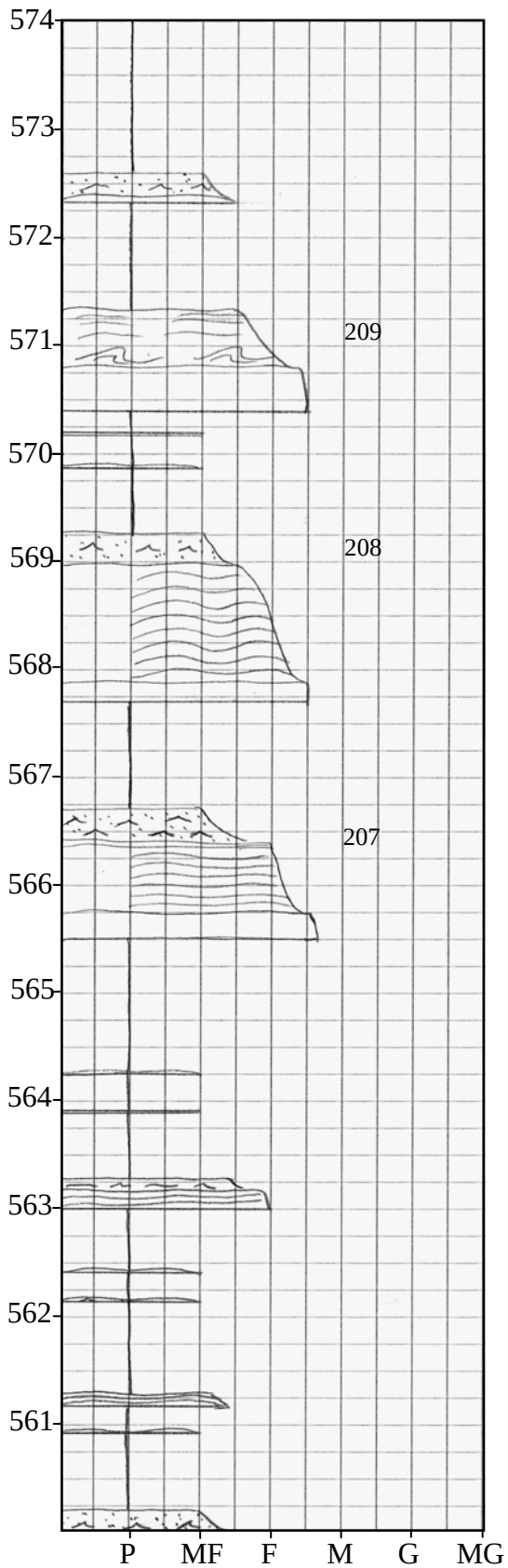
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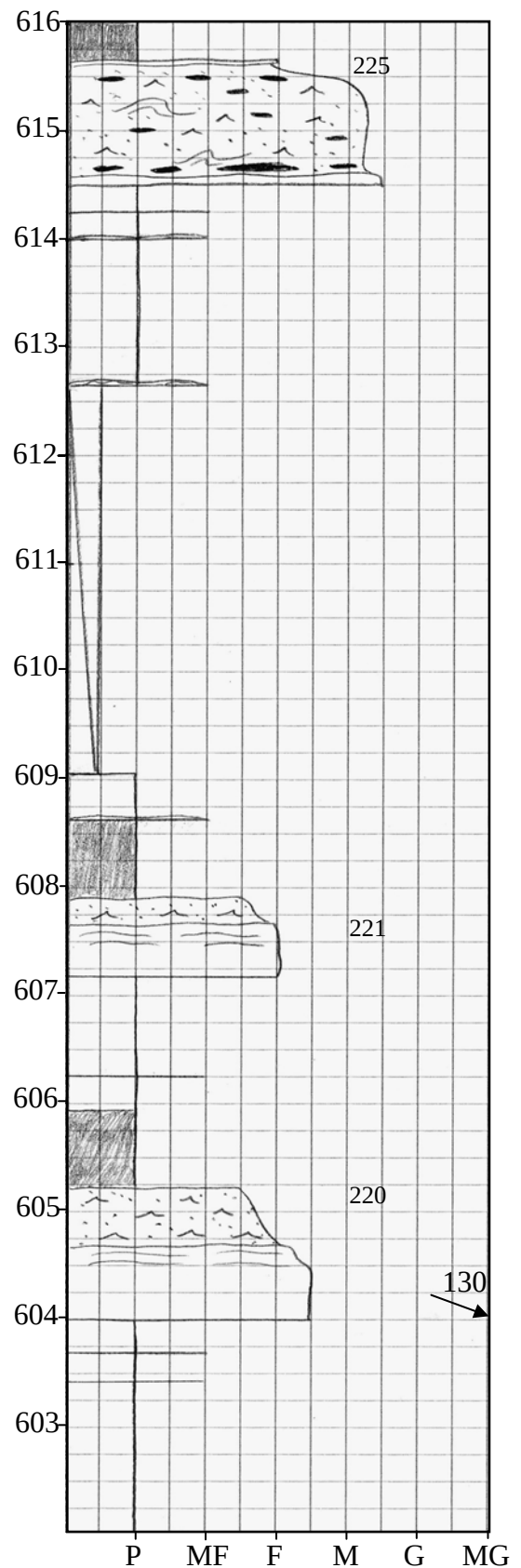
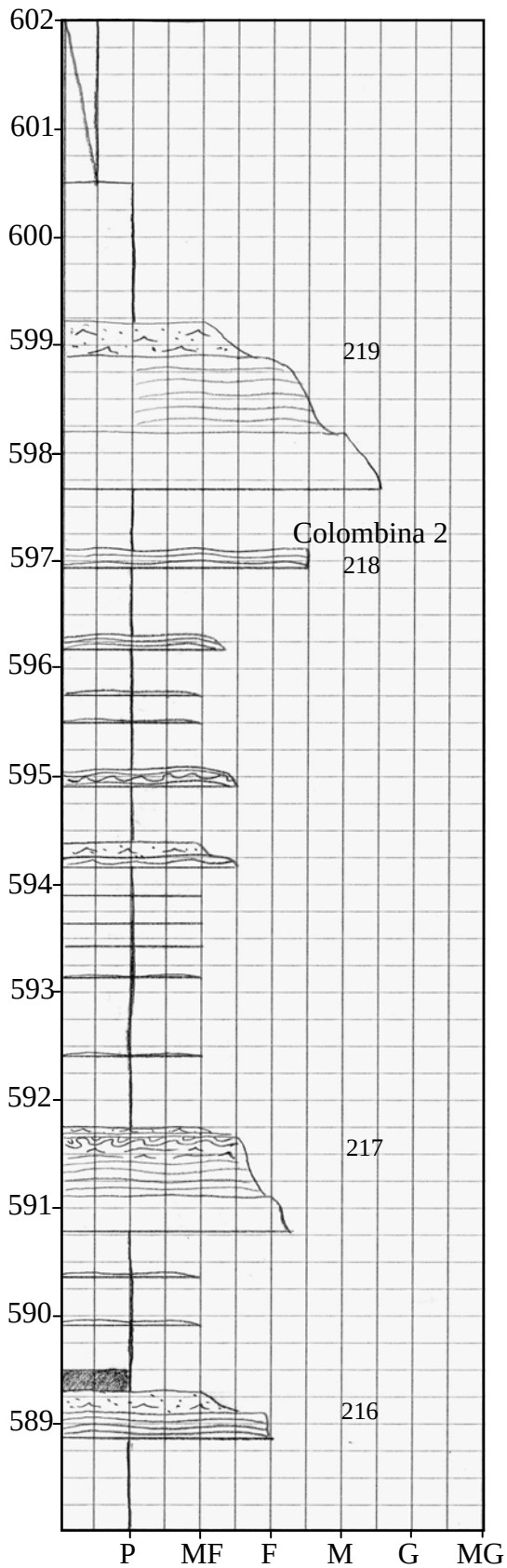
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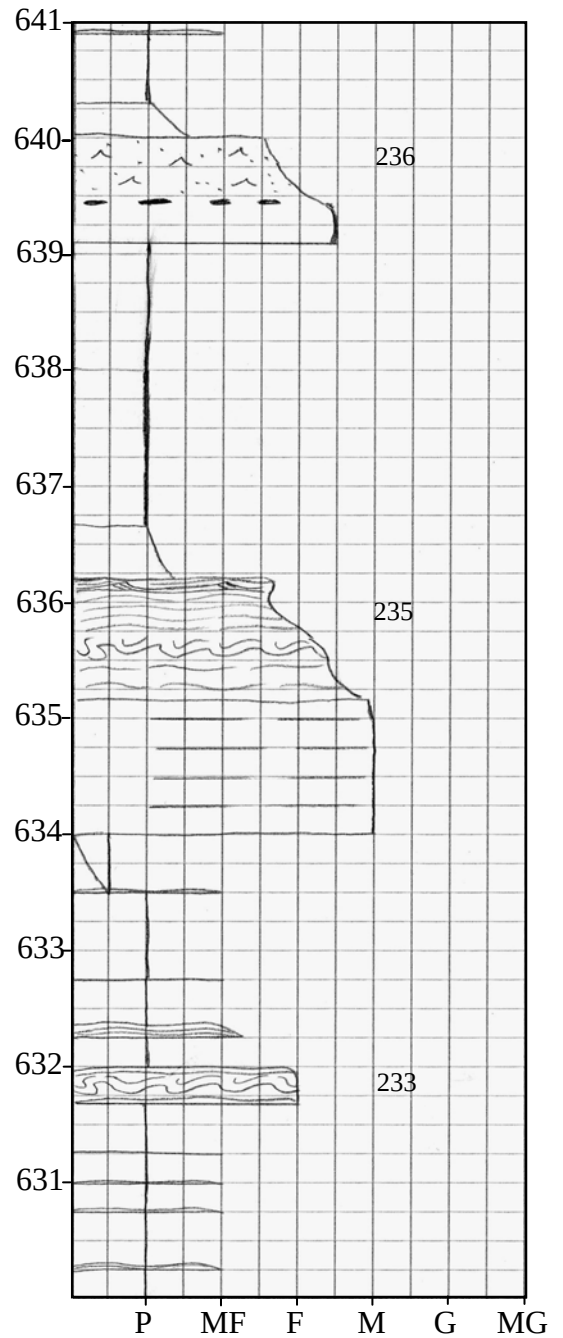
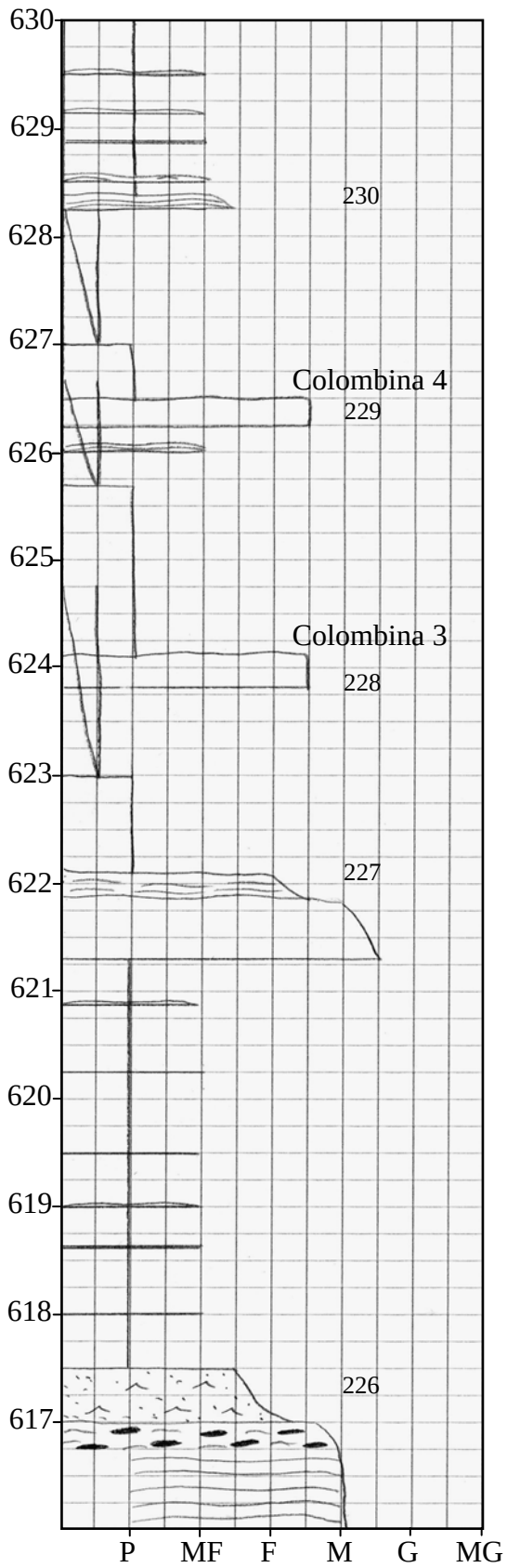
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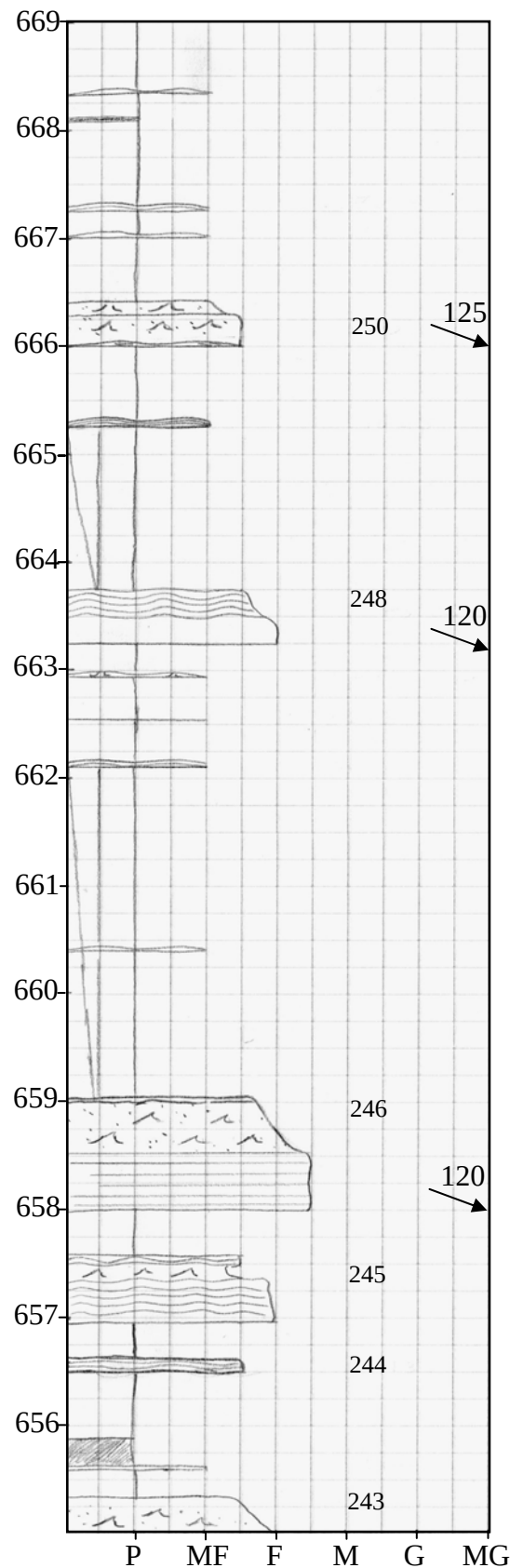
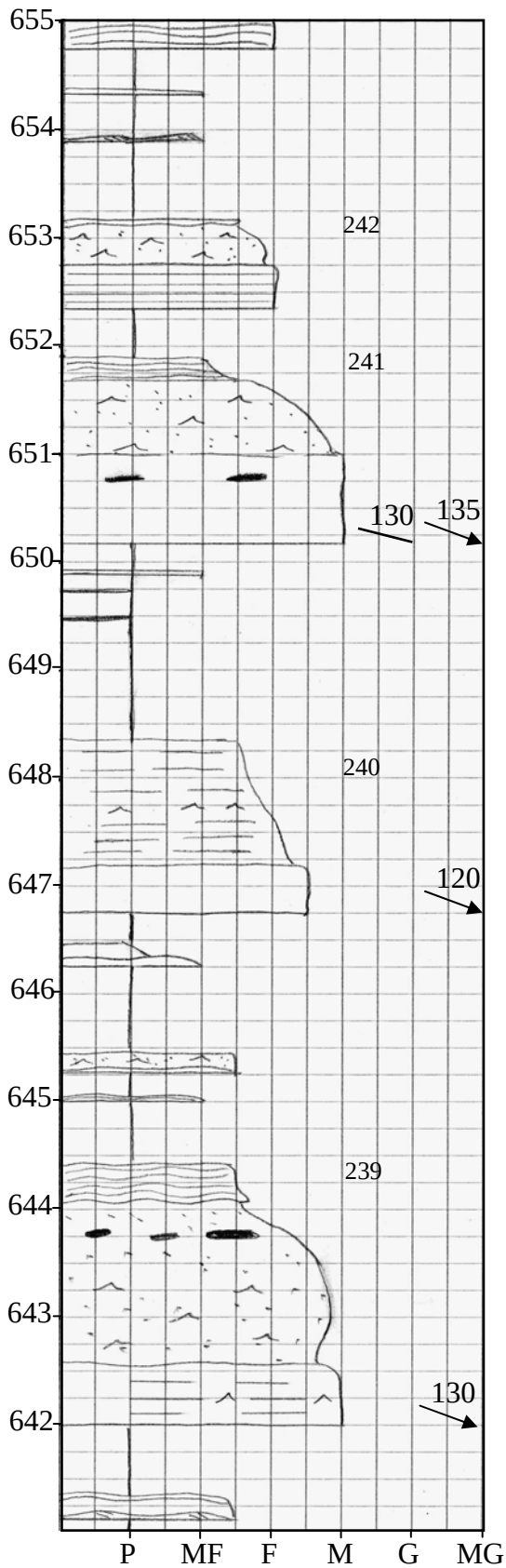
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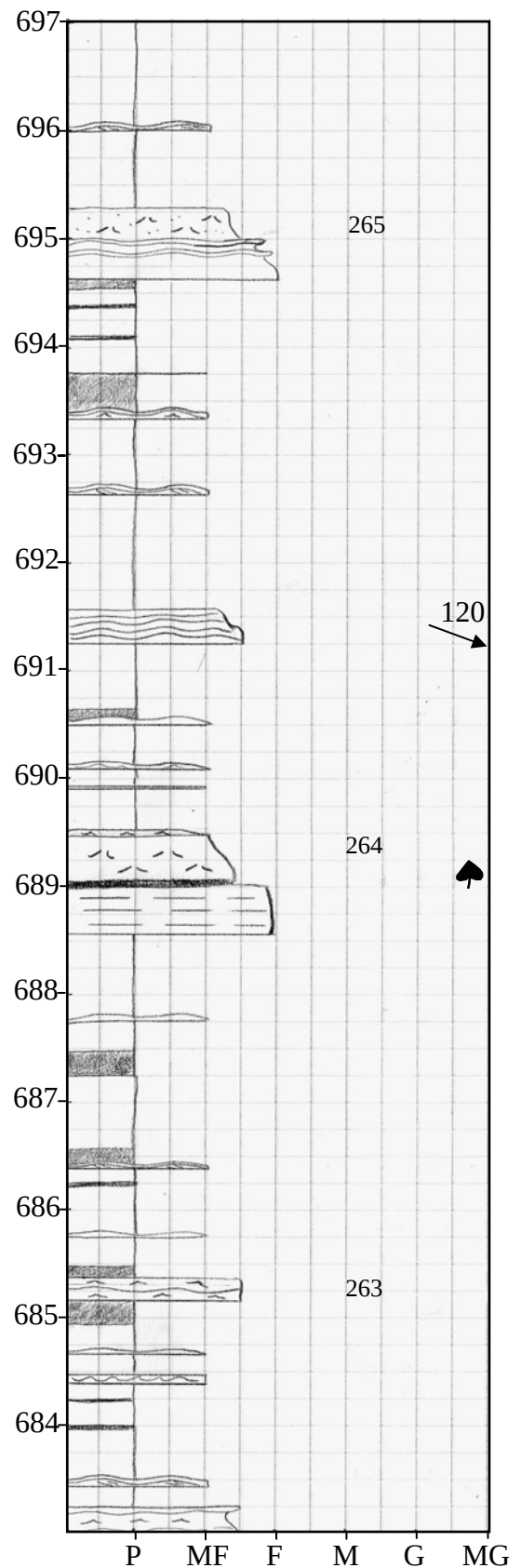
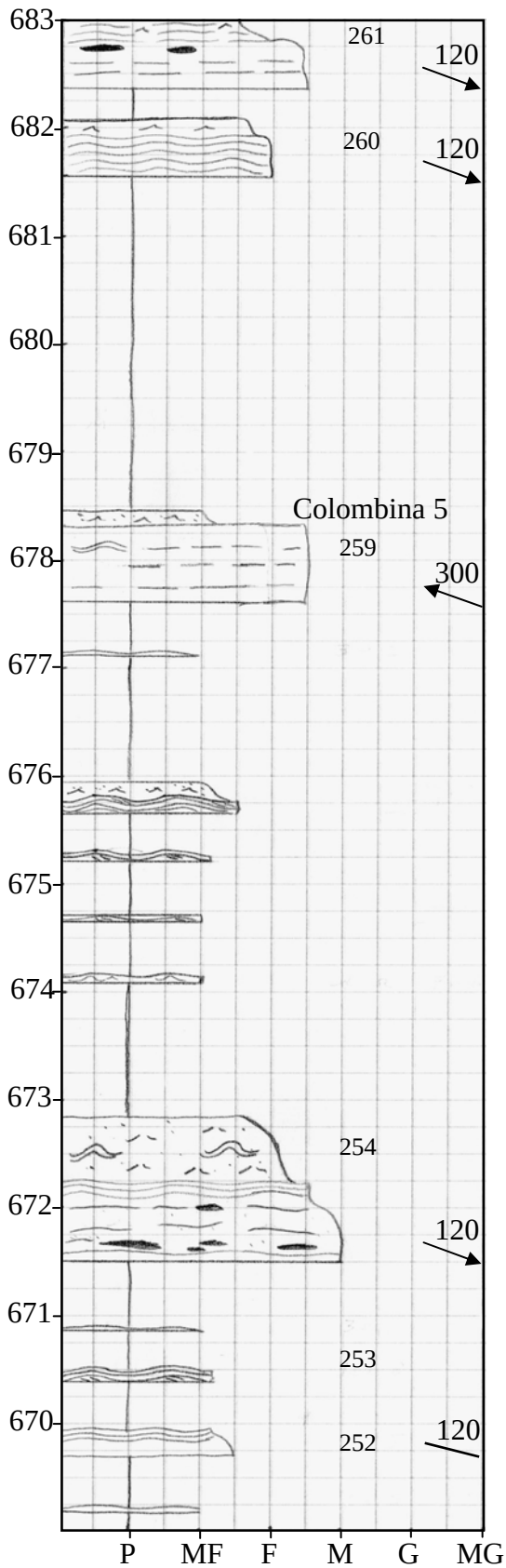
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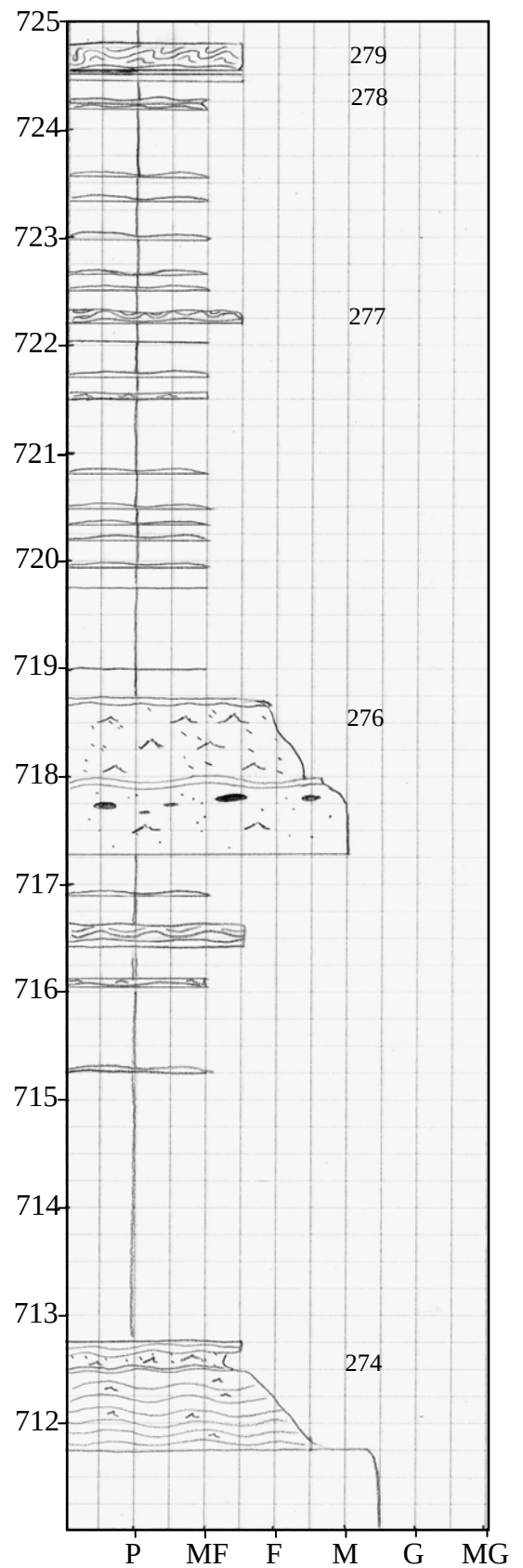
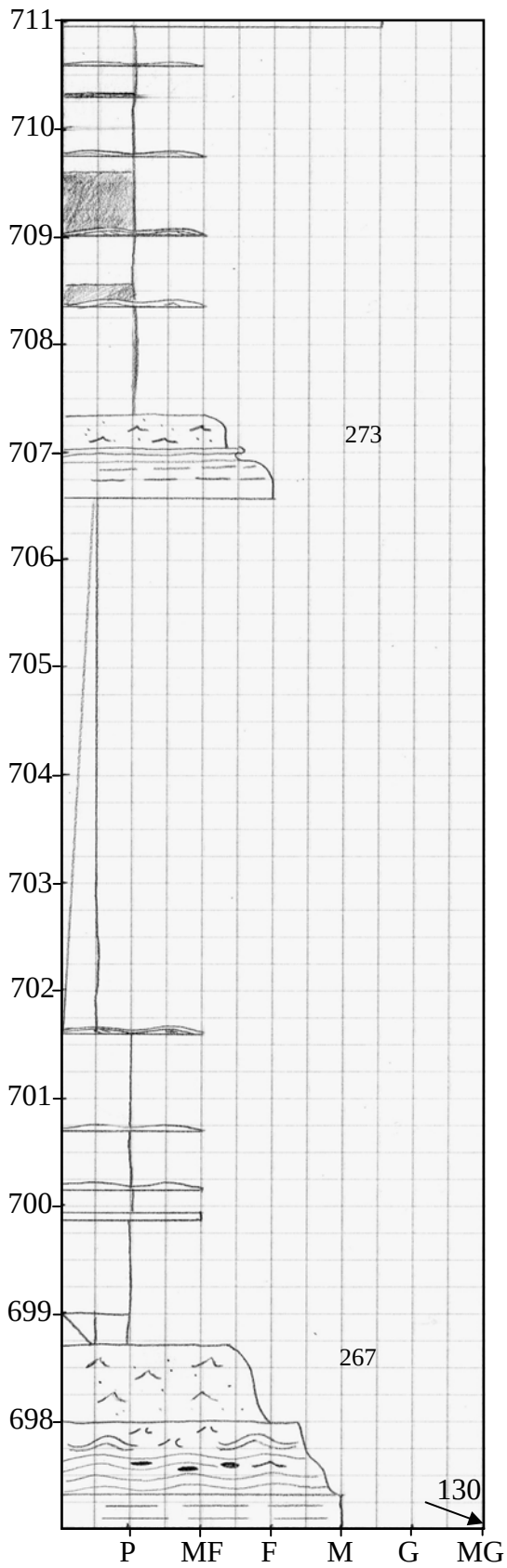
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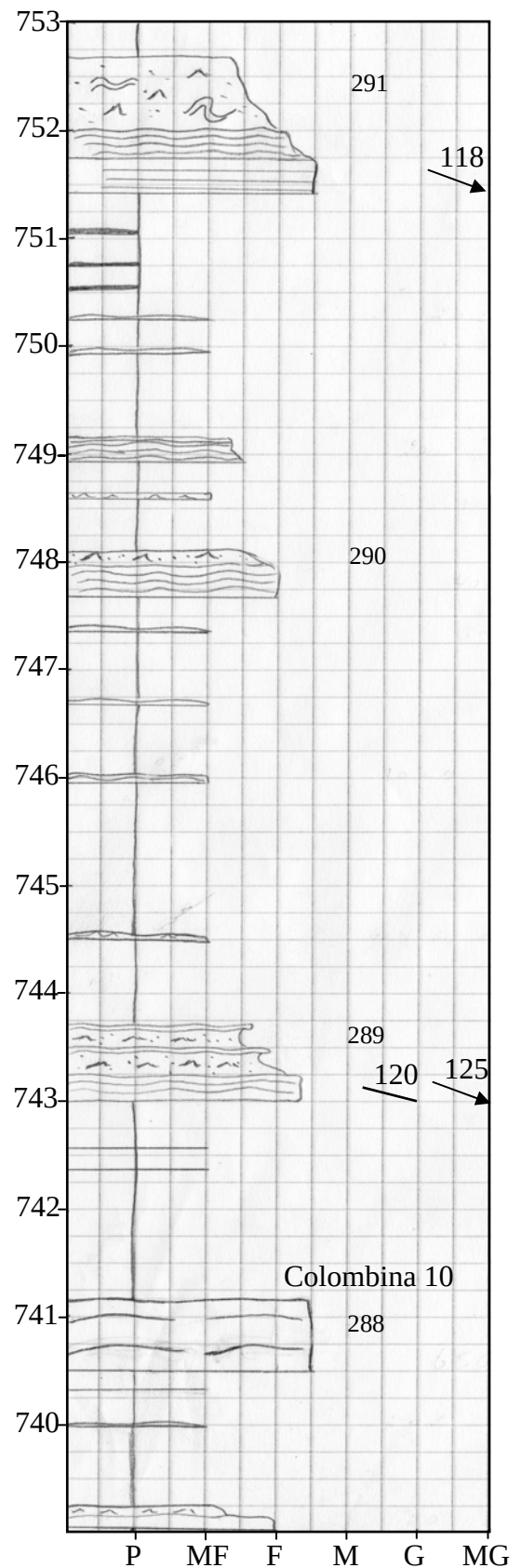
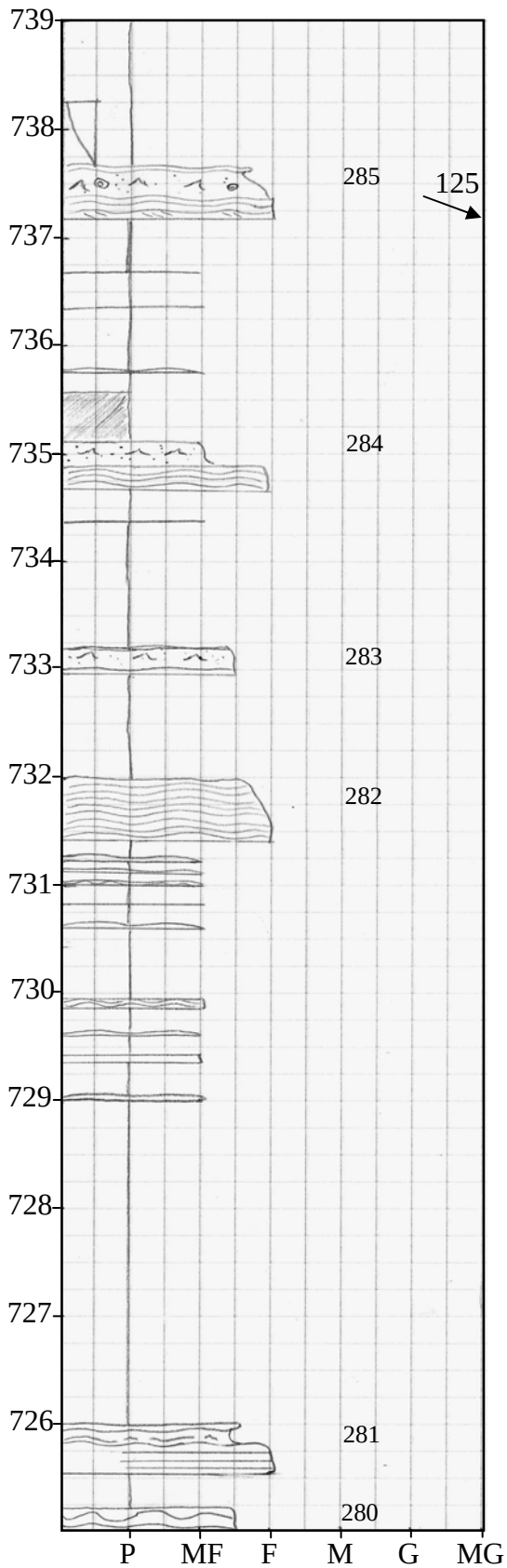
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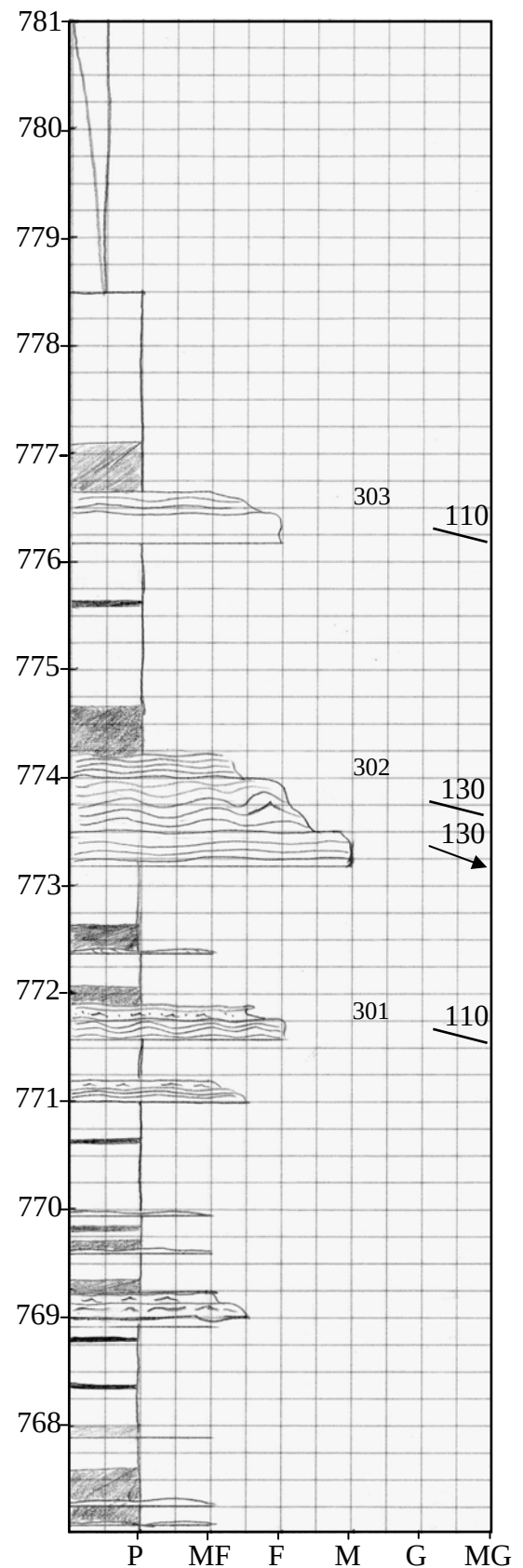
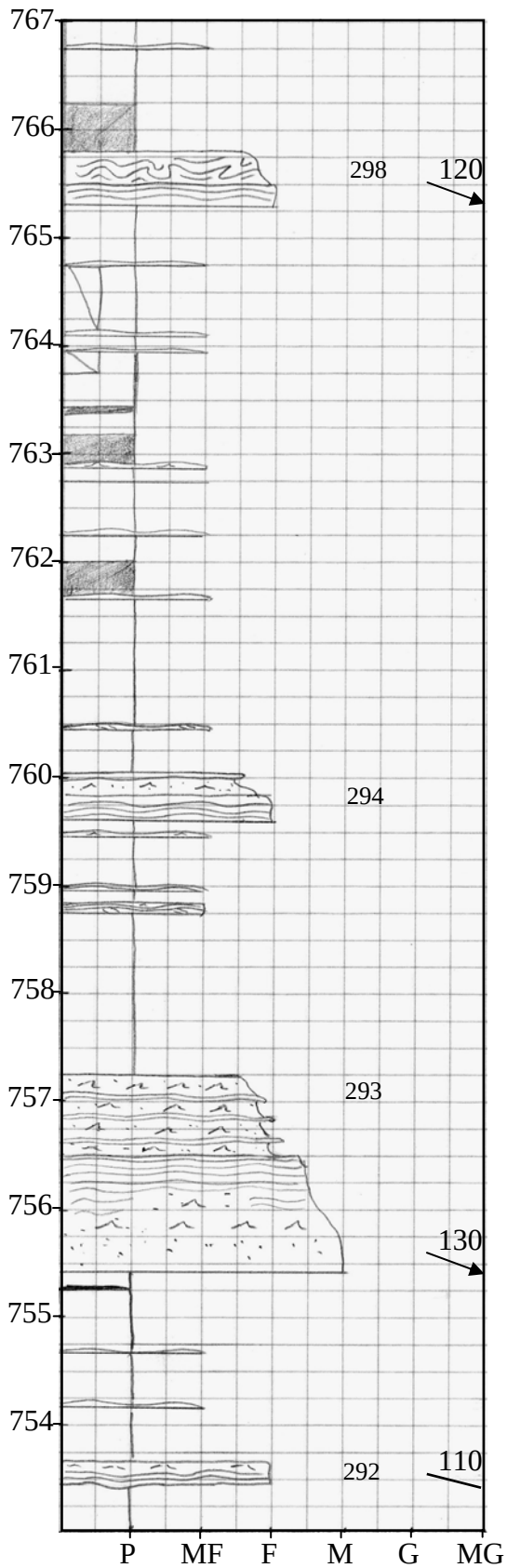
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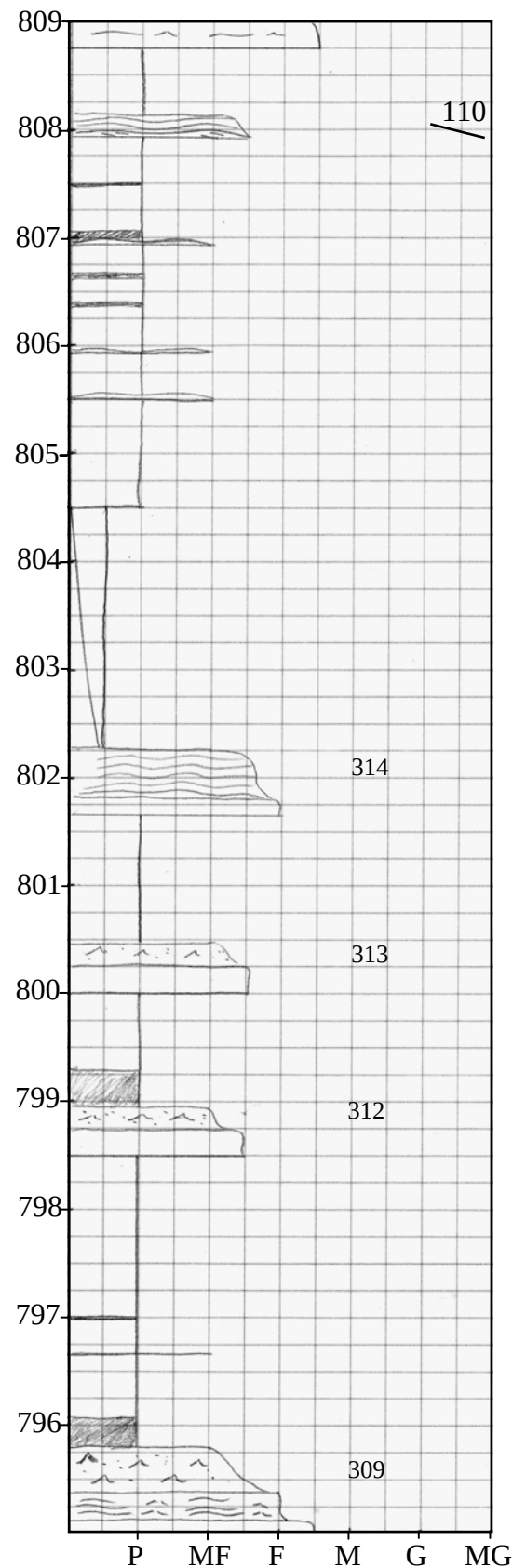
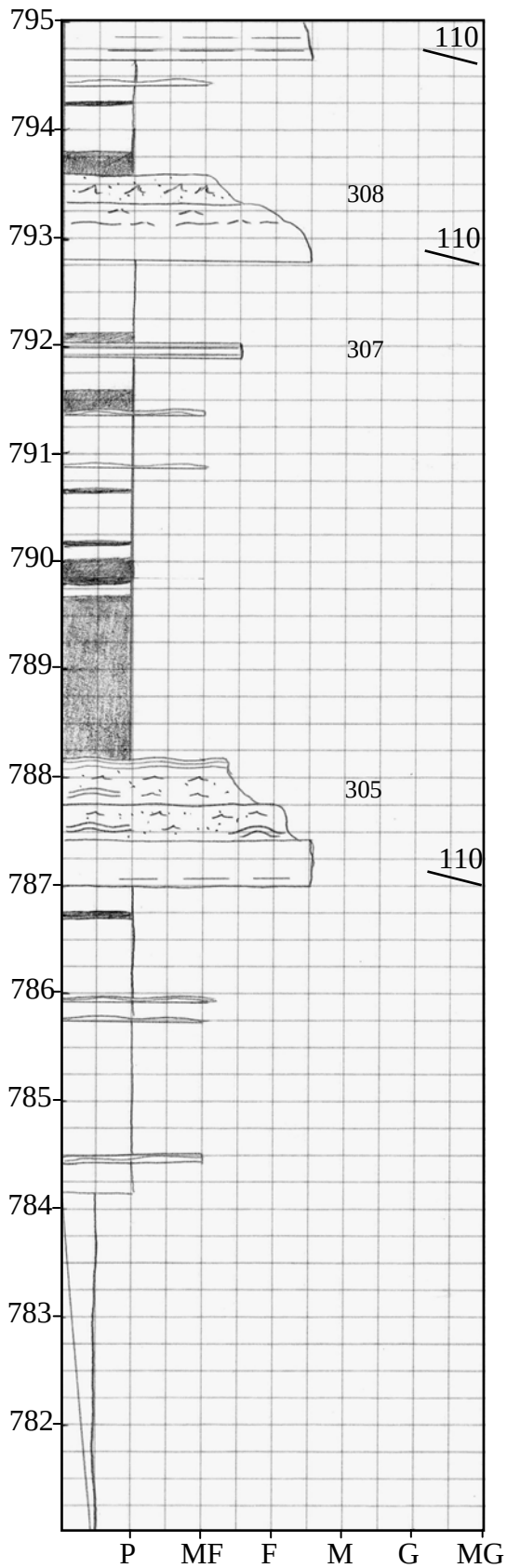
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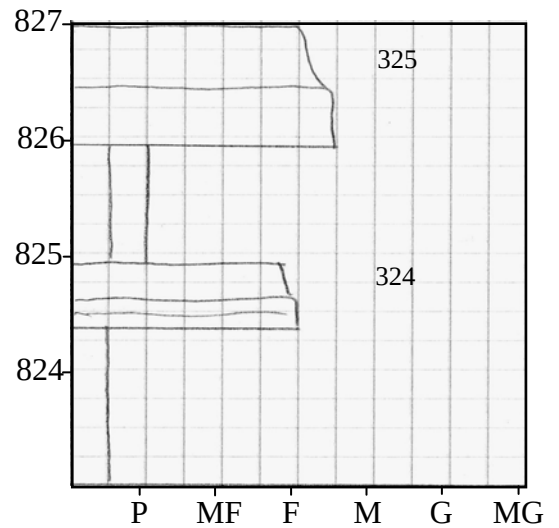
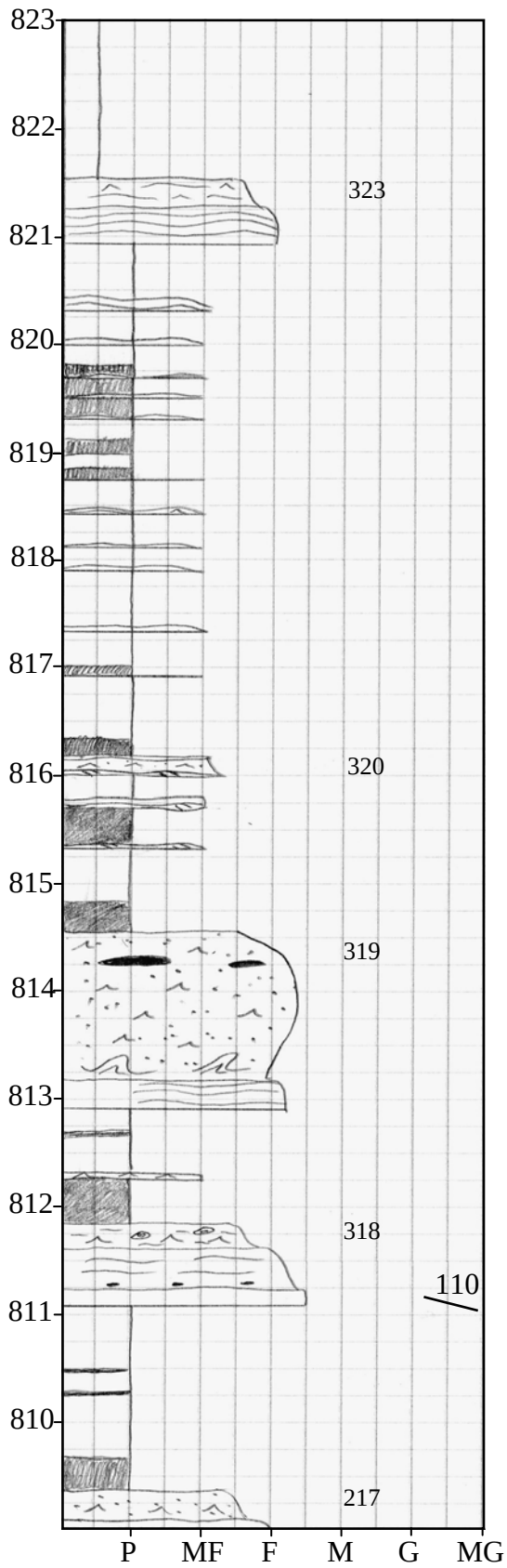
Sezione D



Sezione D



Sezione D



Sezione E

La sezione E caratterizzata da 826 m di spessore, è stata misurata lungo la linea di dislivvio che separa i paesi di Cabelli e Sasso (Fig. 7). La base di questa sezione è ubicata lungo la strada SS310, a circa di 1 Km a sud del paese di Cabelli (Fig. 7). I primi 63 m della sezione affiorano lungo la strada statale mentre gli altri 763 m sono stati misurati lungo la linea di spartiacque che va verso la località di Campo Cento Noci, all'interno del Parco Nazionale Casentino, Monte Falterona, Campigna. Questa sezione presenta un dislivello di 520 m, ossia si va dalla quota di 380 m, che coincide con la strada SS310, fino ai 900 m, dove affiora la Colombina 30 (MT). In questa sezione, inoltre, si ritiene importante rimarcare l'ottima qualità degli affioramenti; degli 826 m di successione, infatti, solo 25 m sono di copertura e si trovano subito dopo lo strato 259 (Colombina 5).

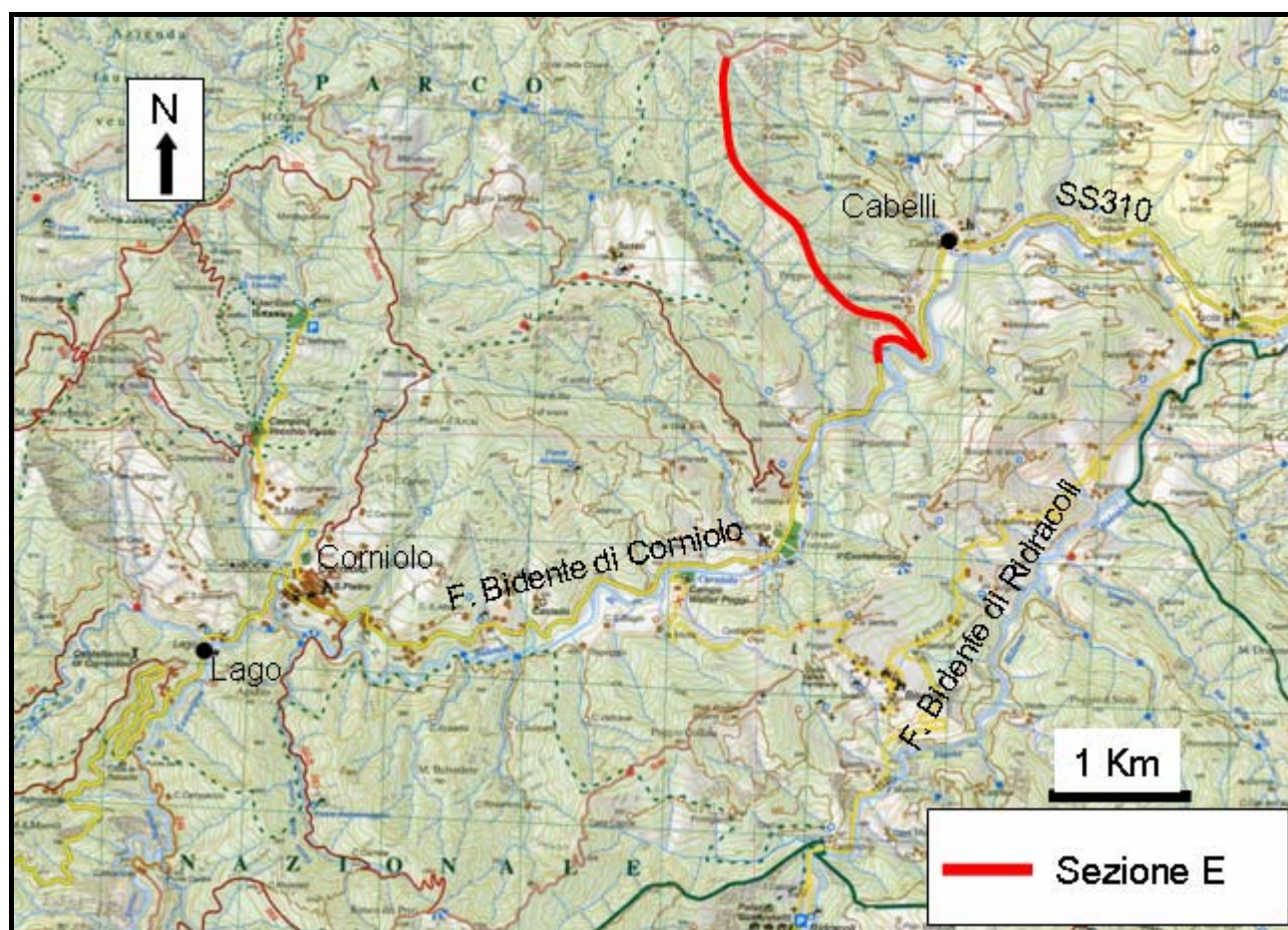
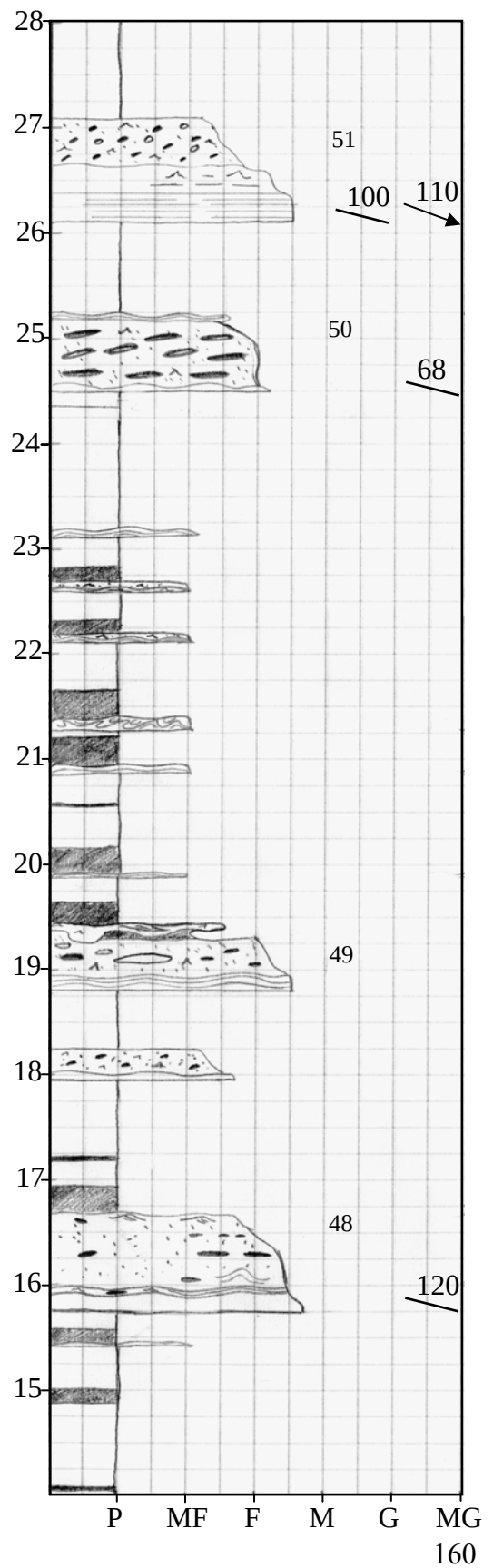
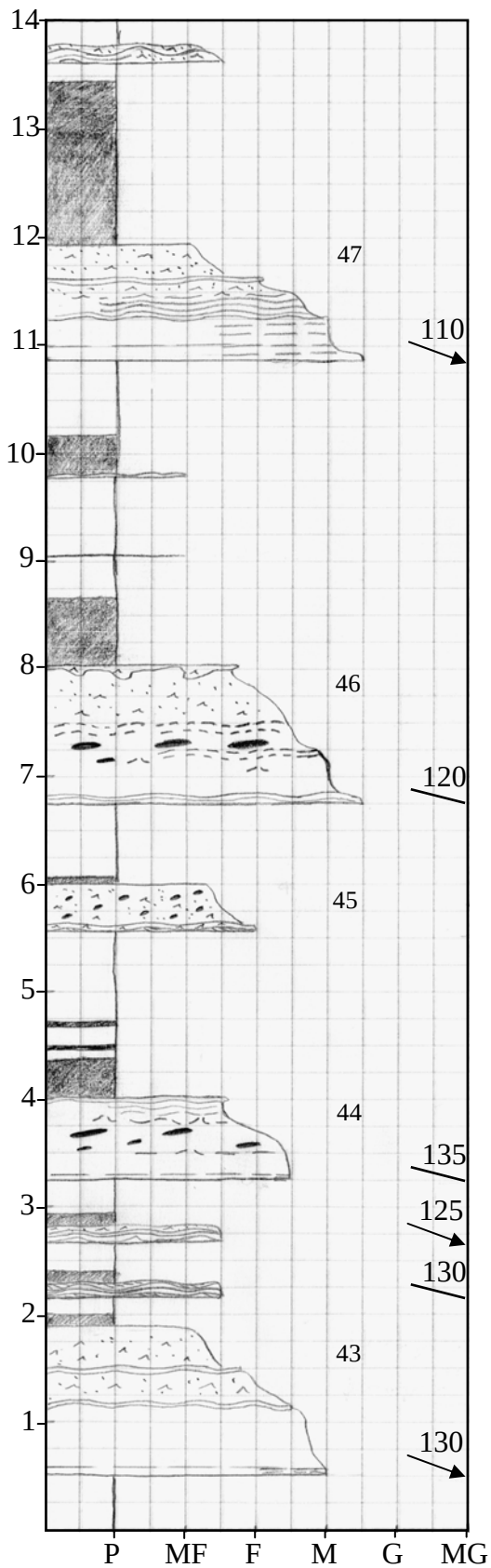
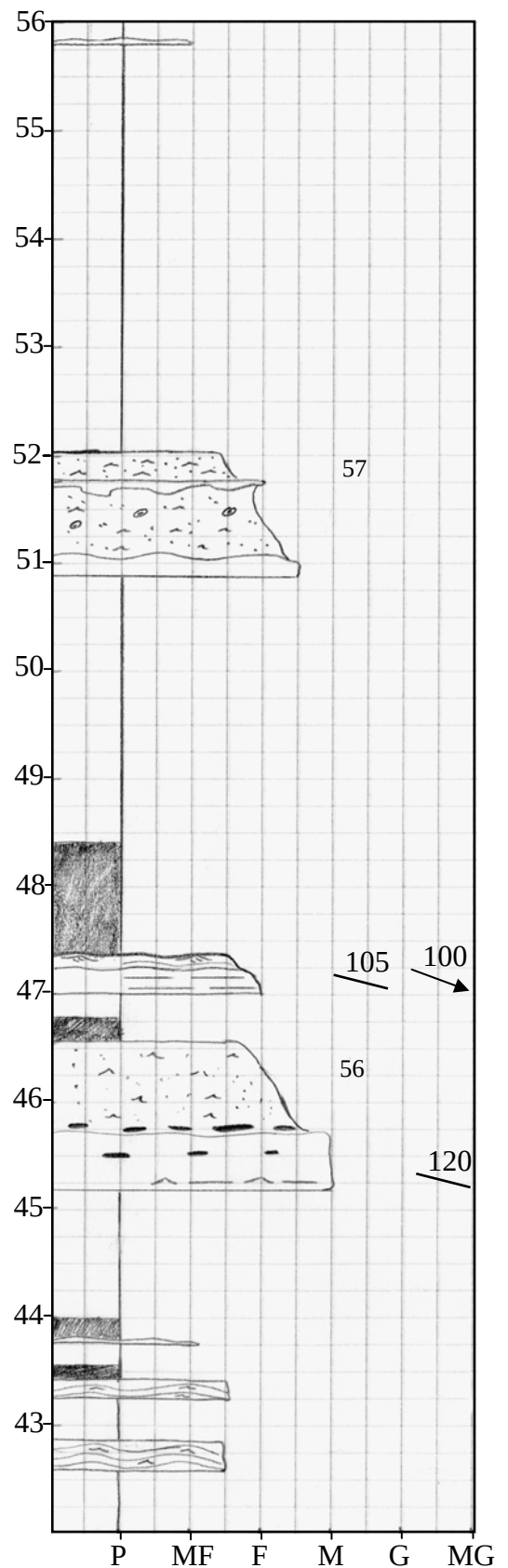
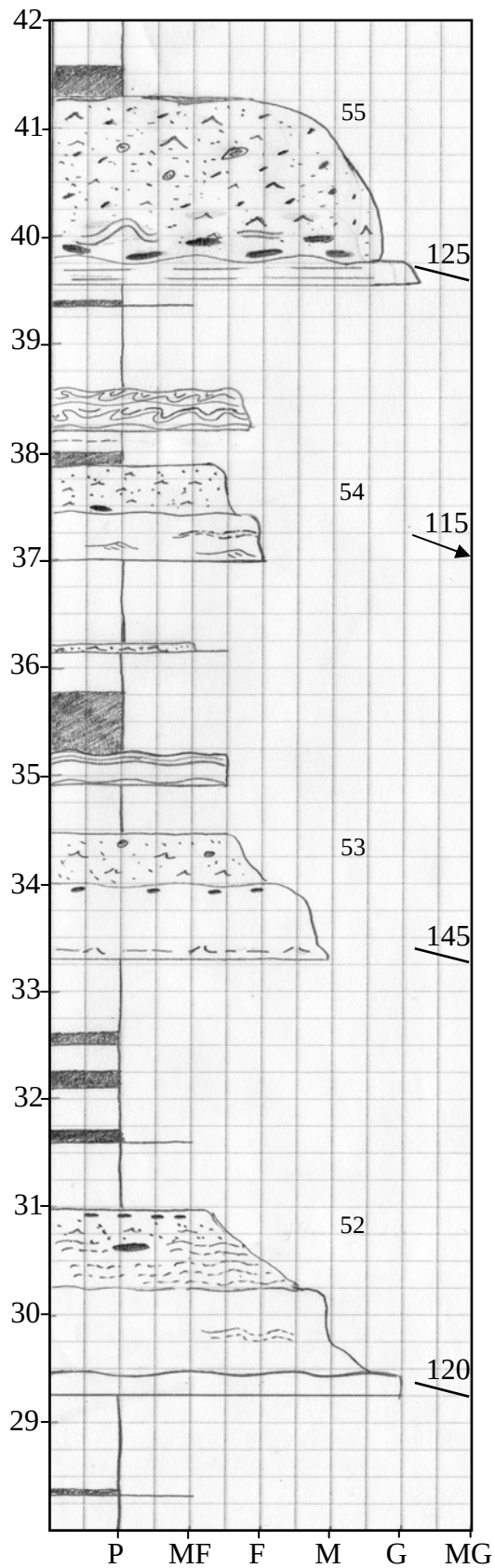


Figura 7- Mappa di localizzazione della sezione E, Valle del Bidente.

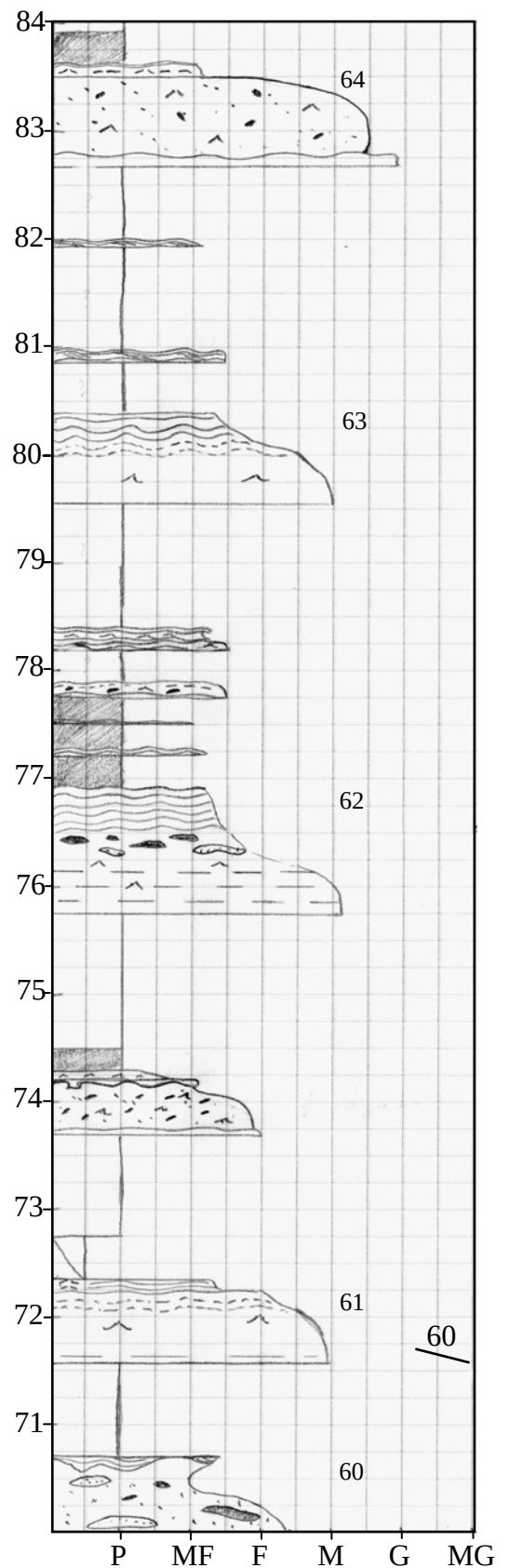
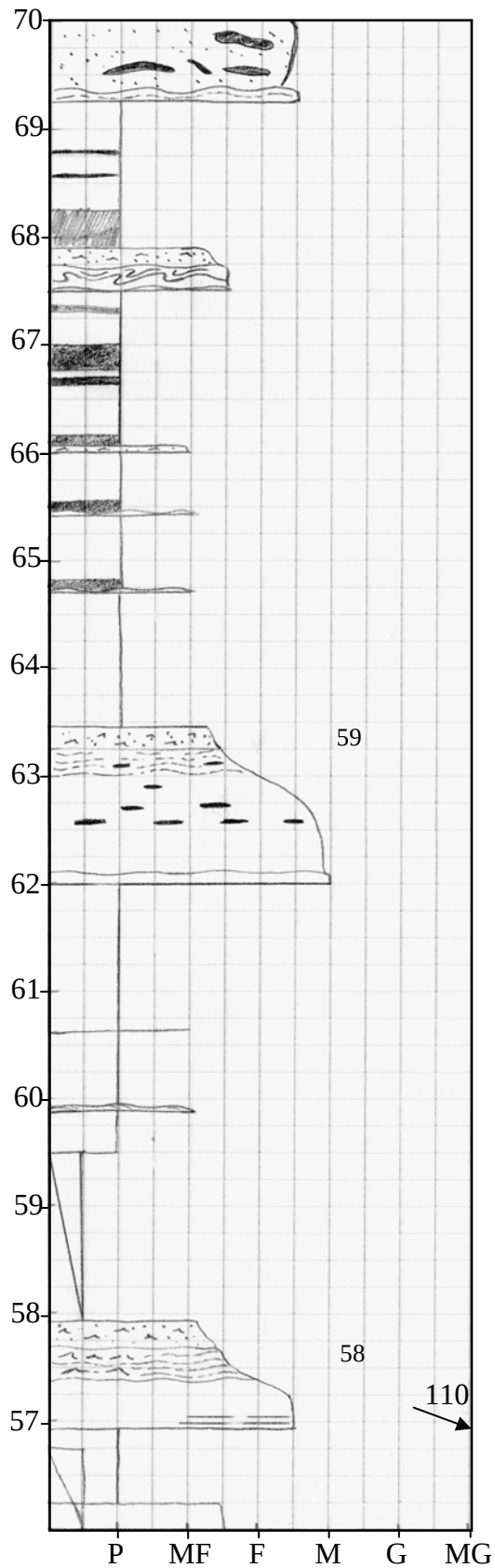
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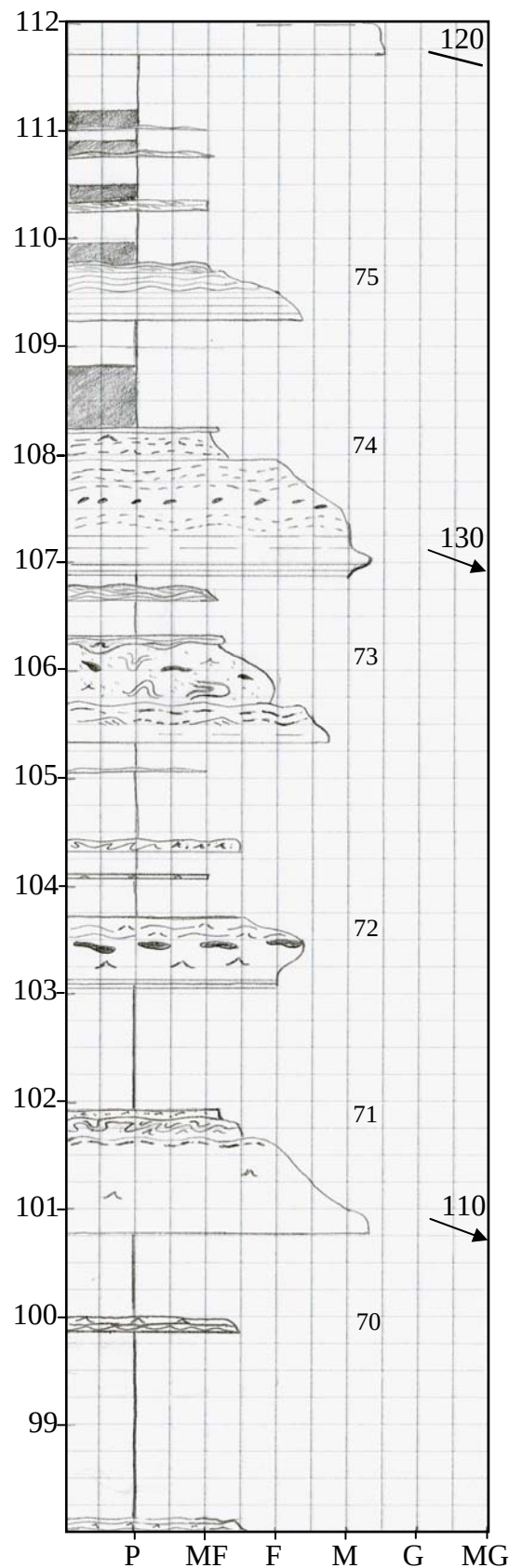
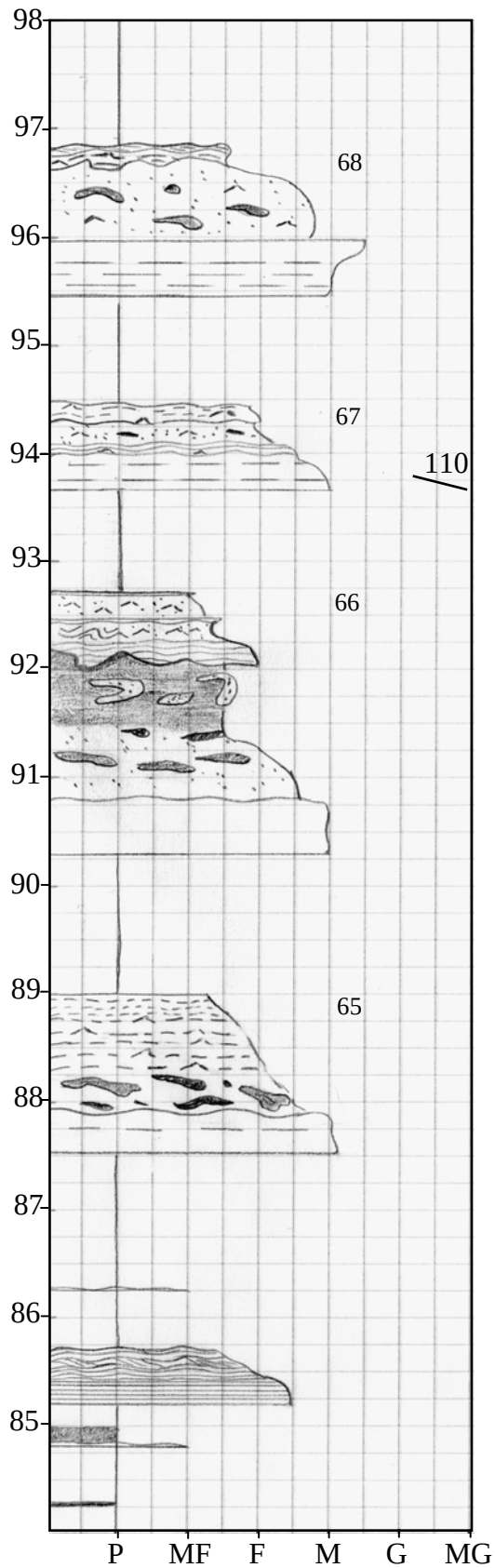
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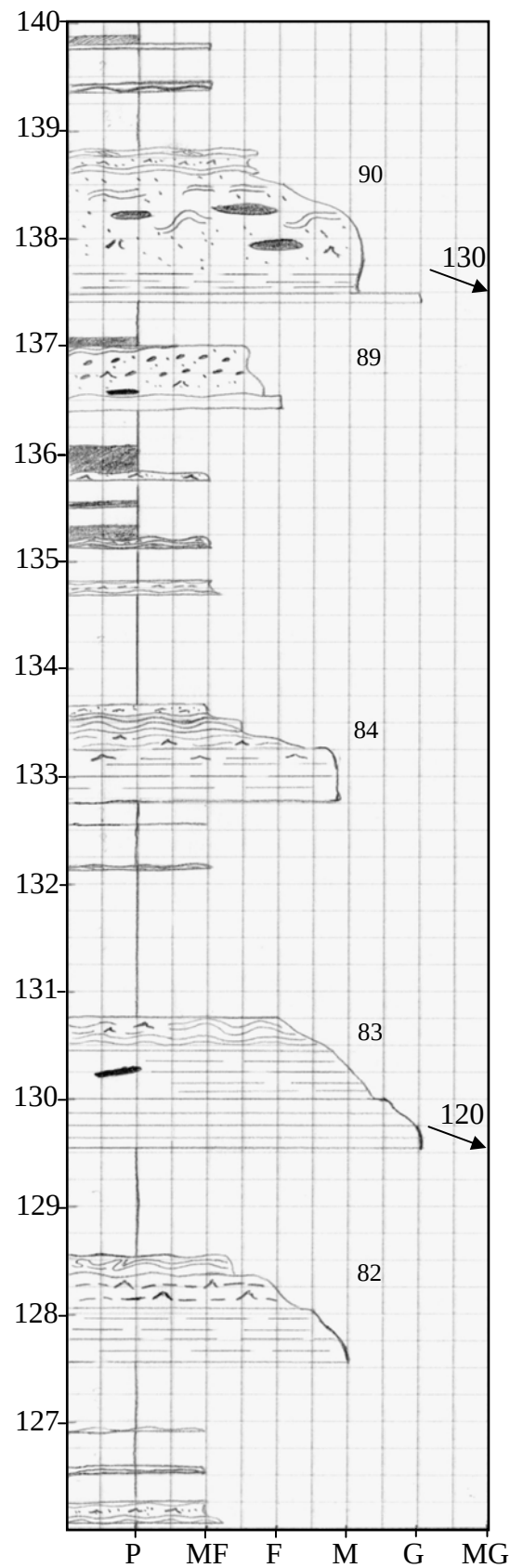
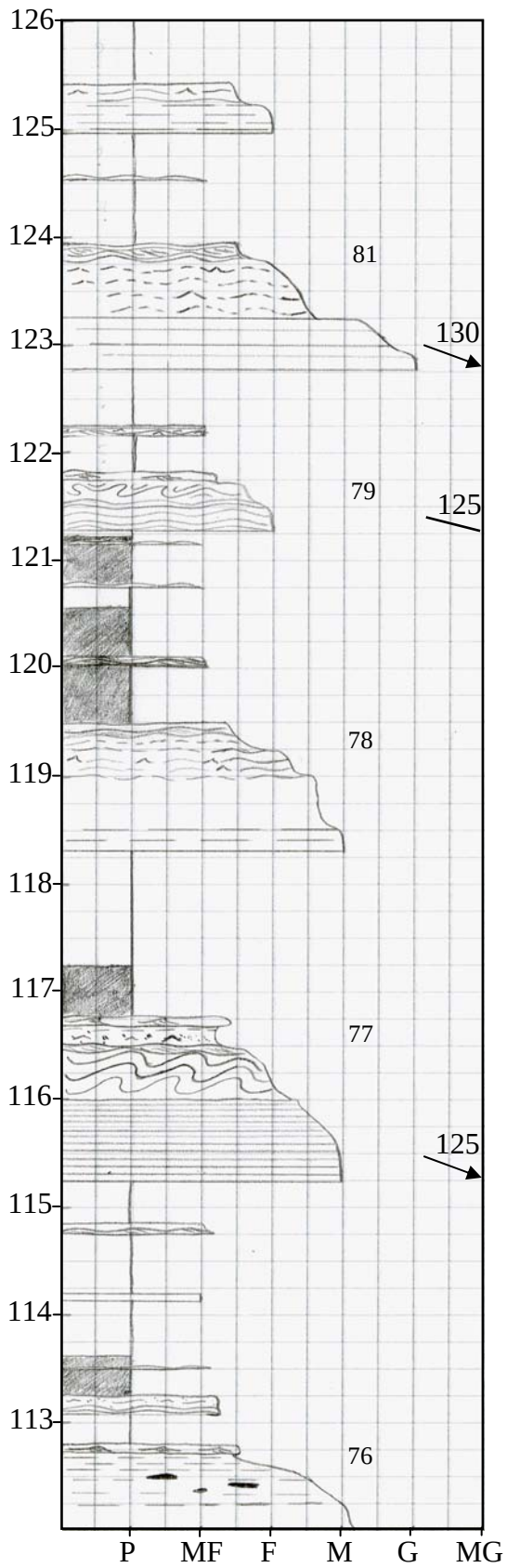
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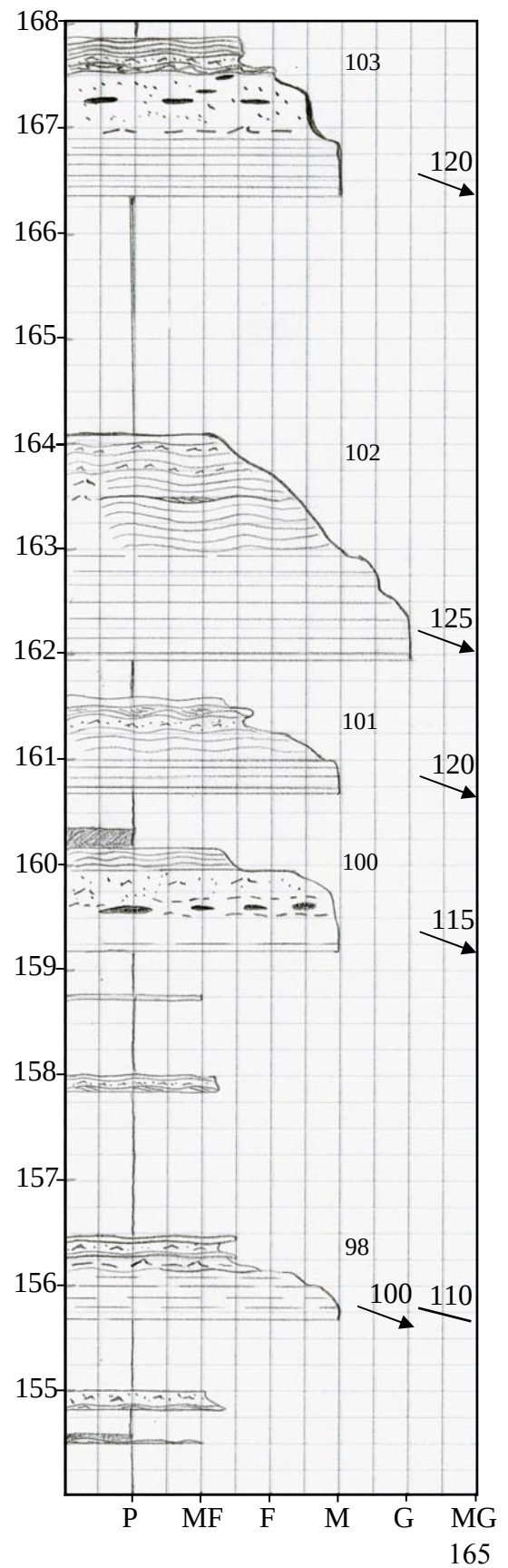
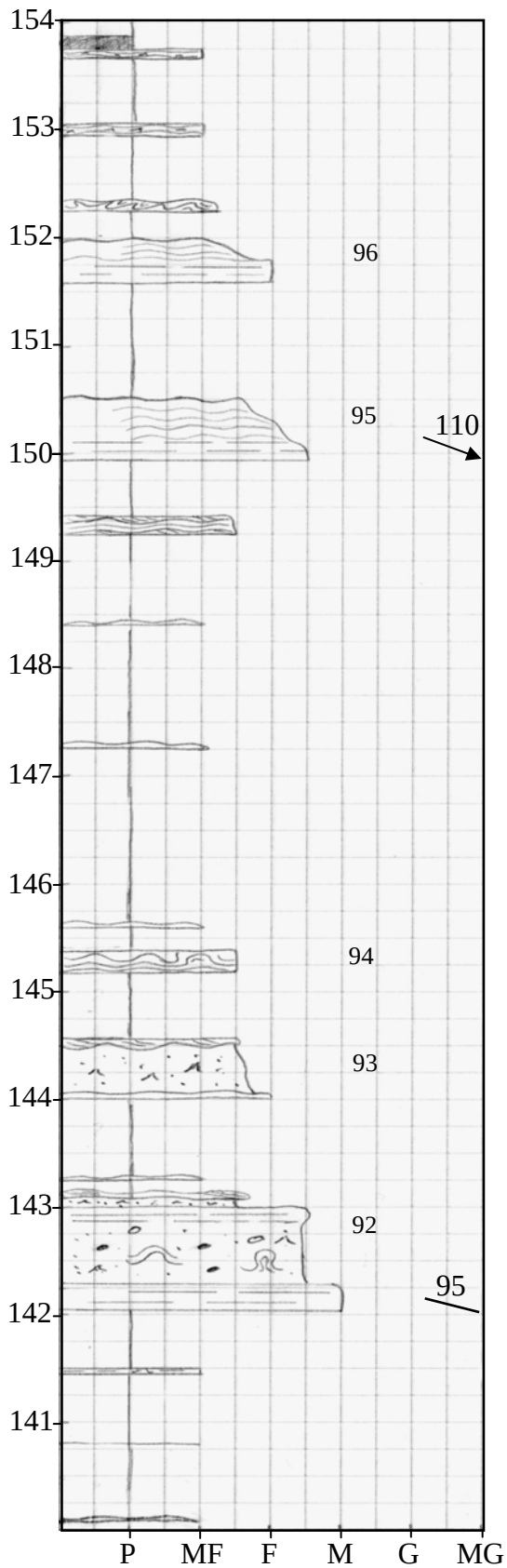
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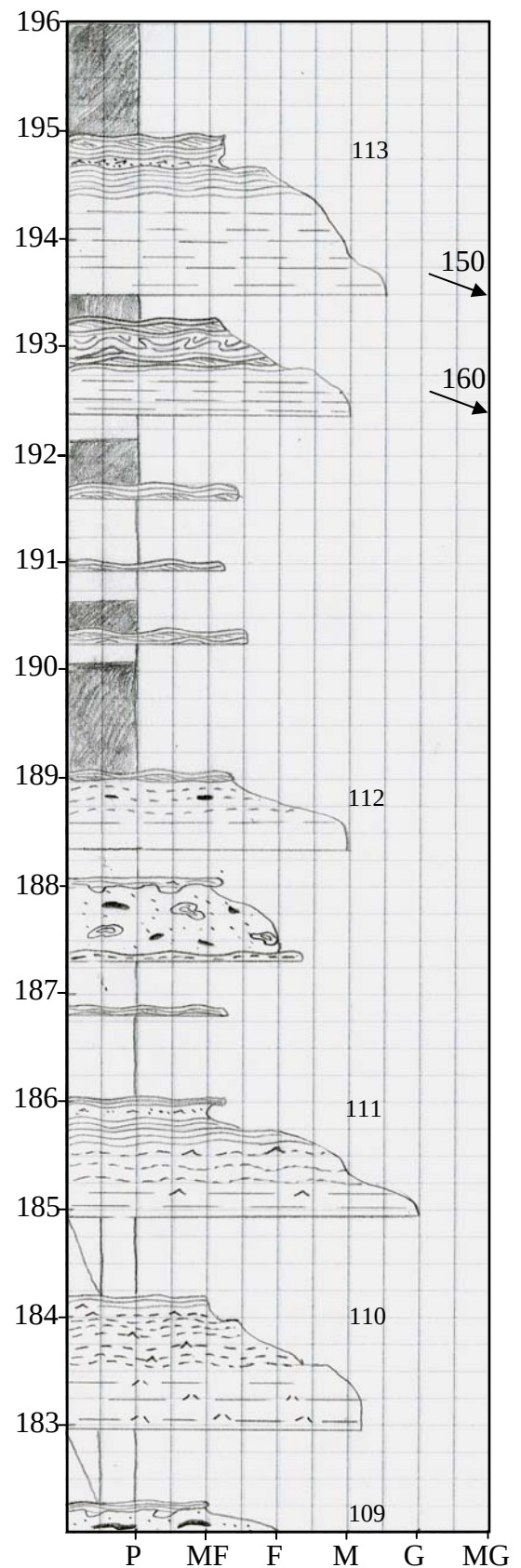
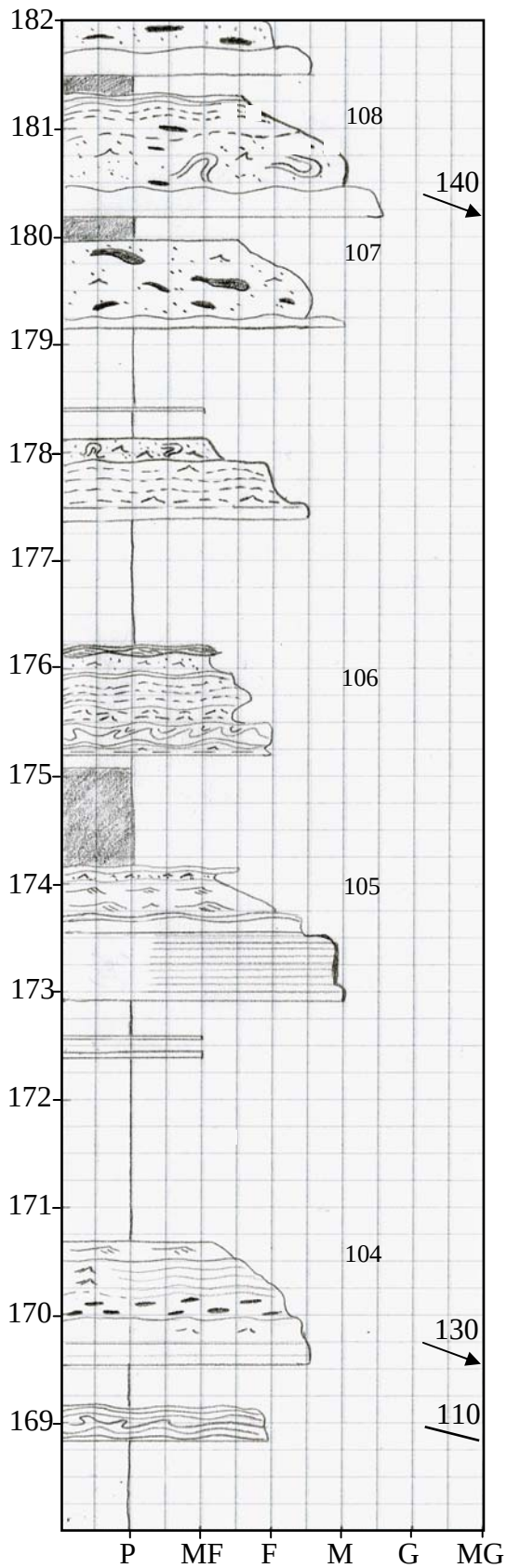
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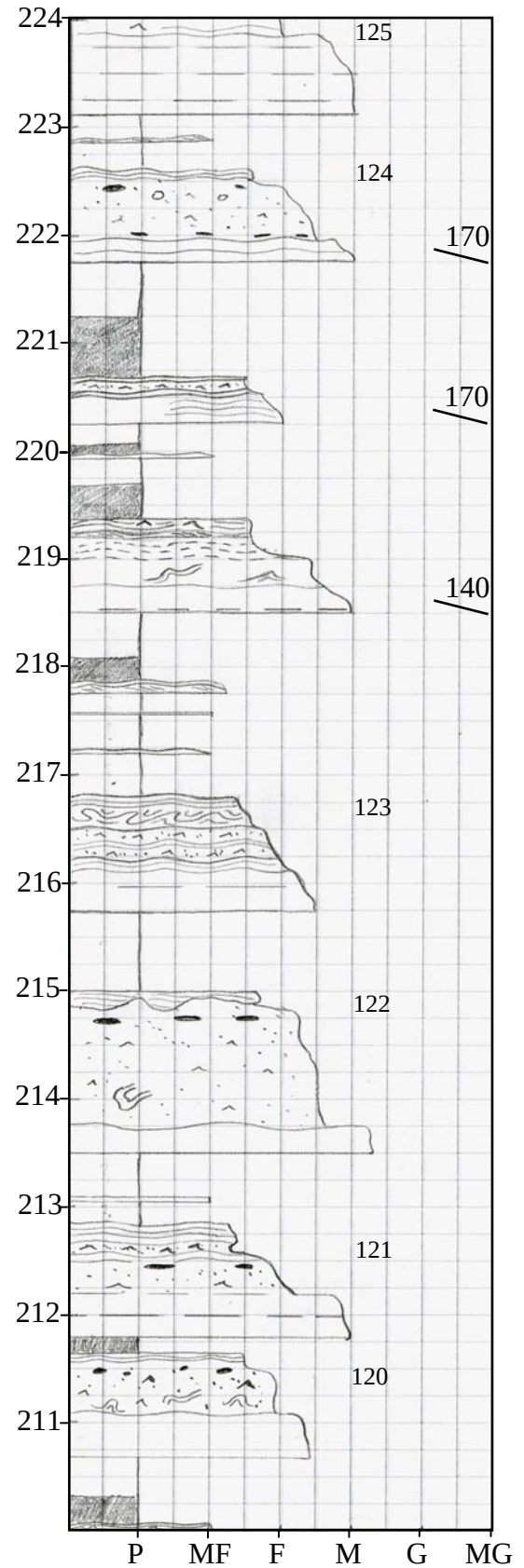
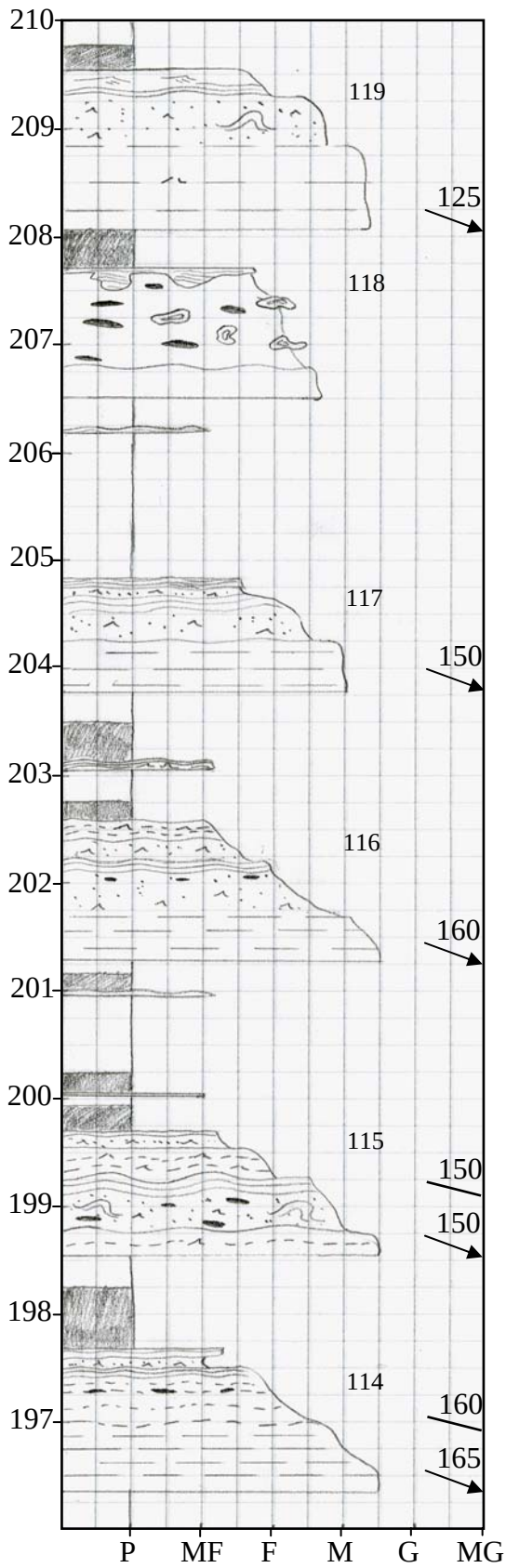
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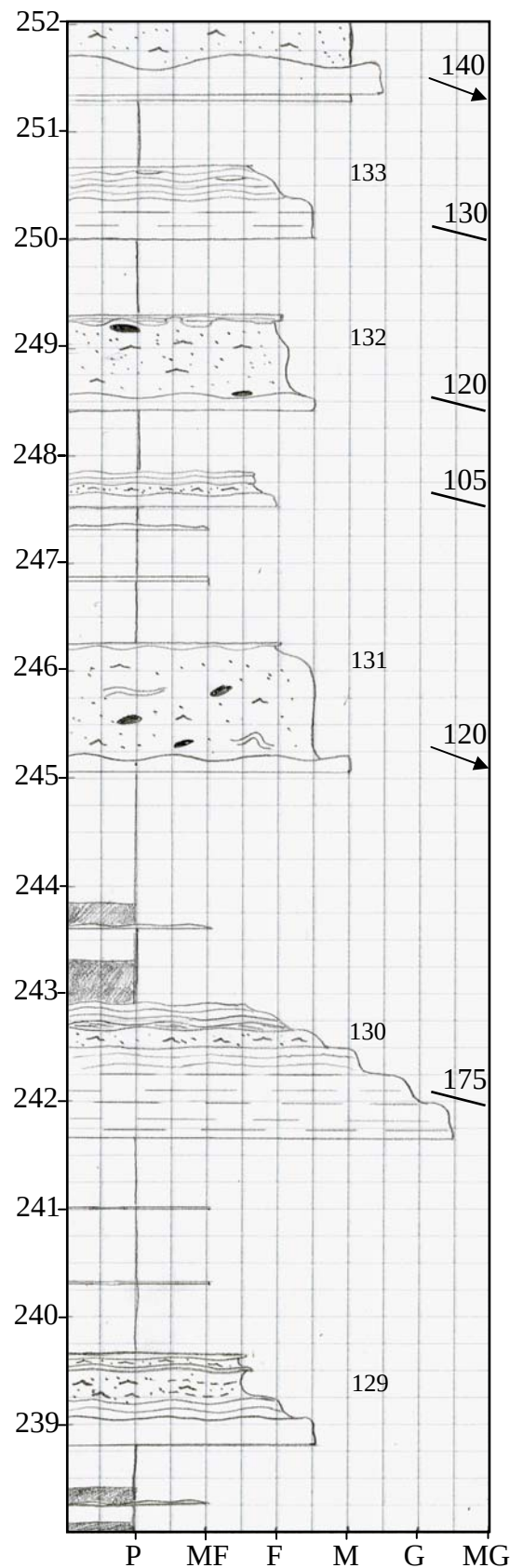
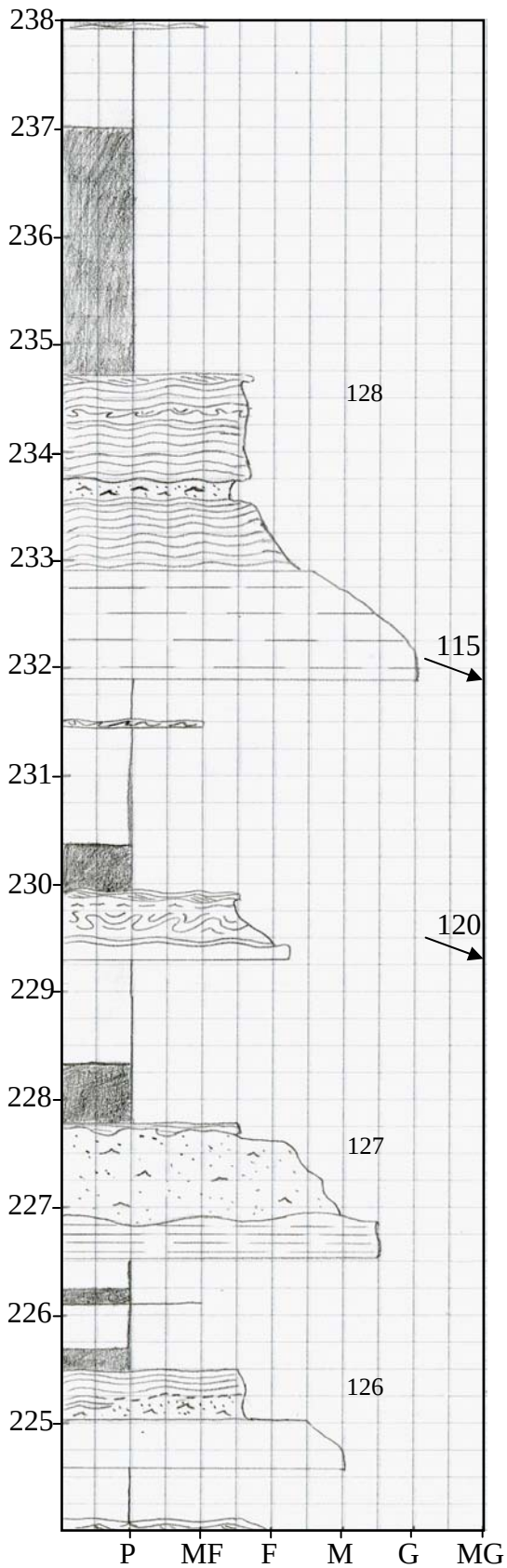
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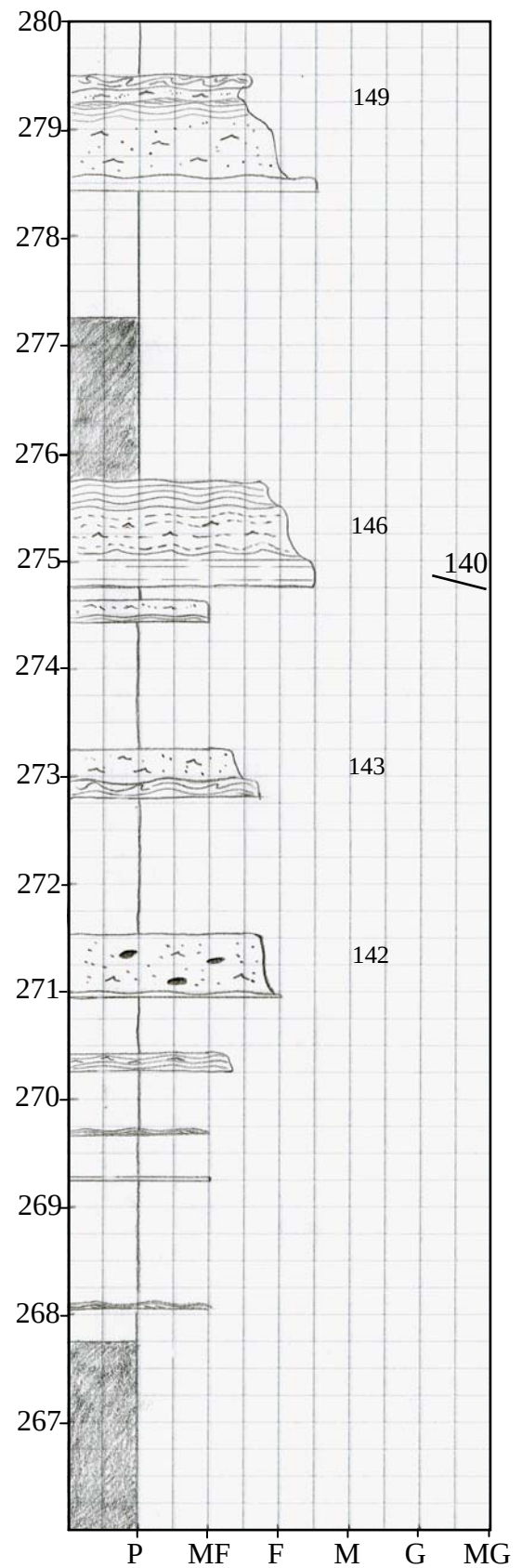
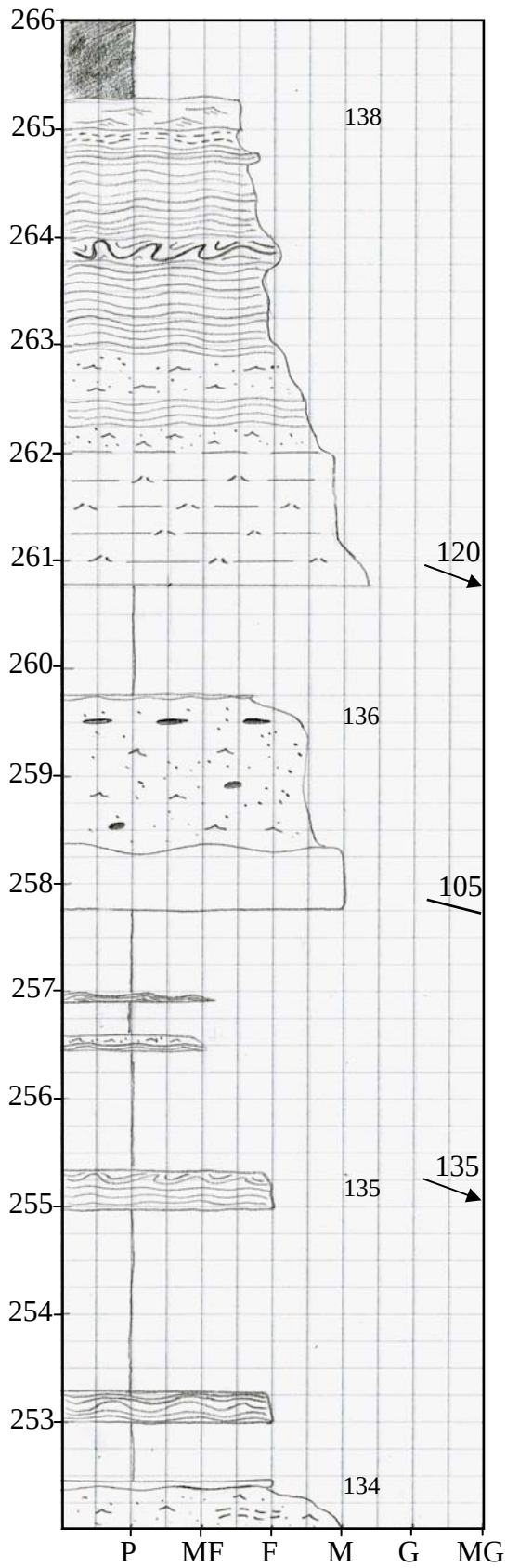
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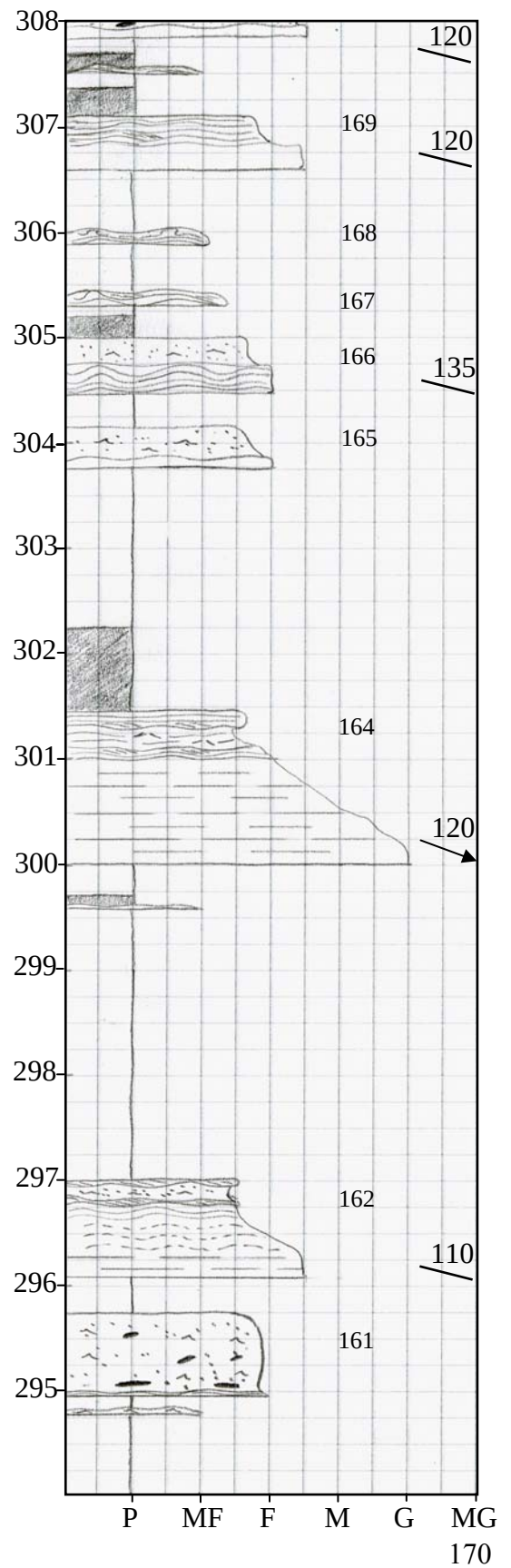
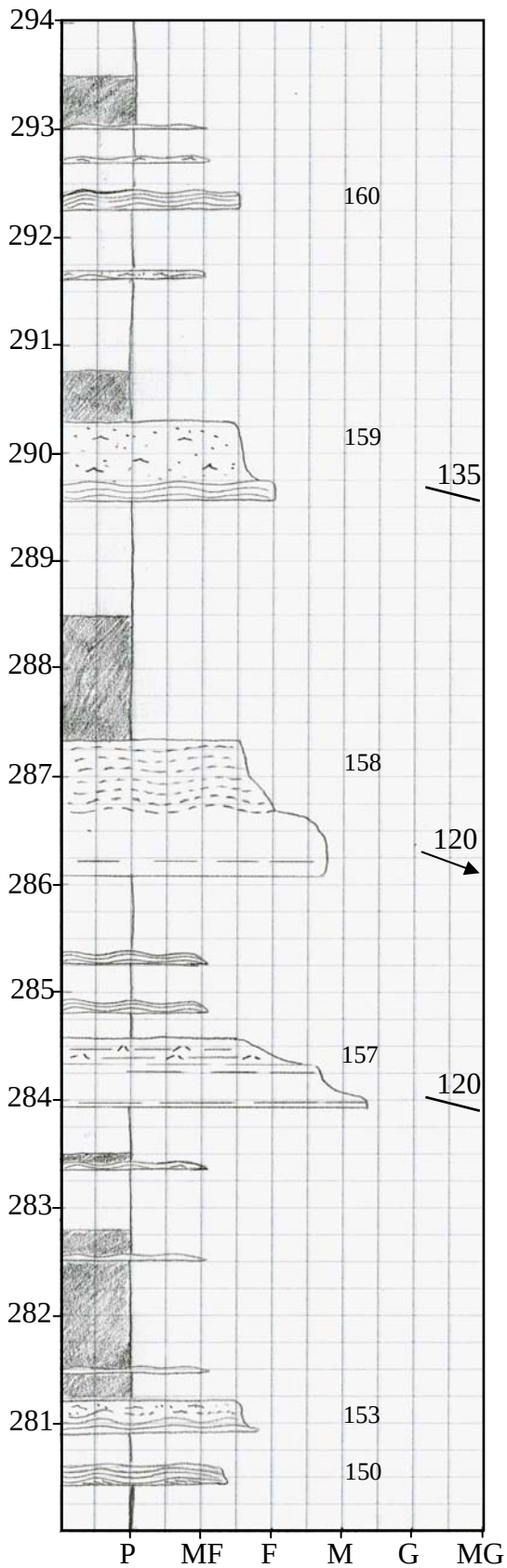
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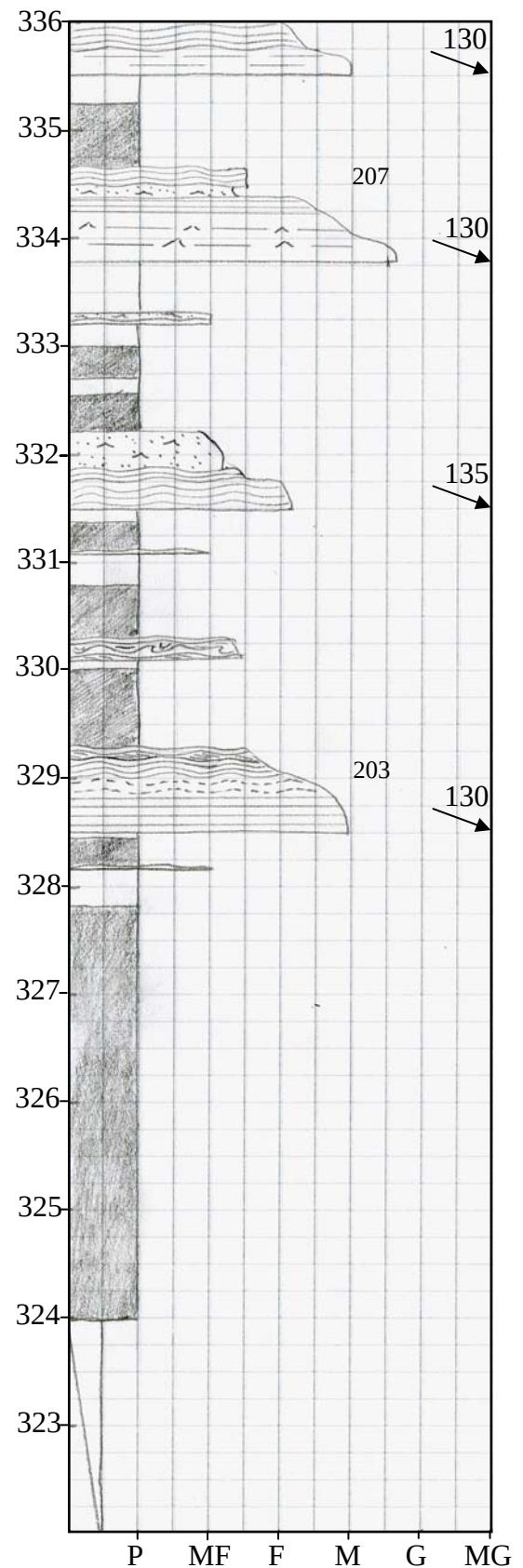
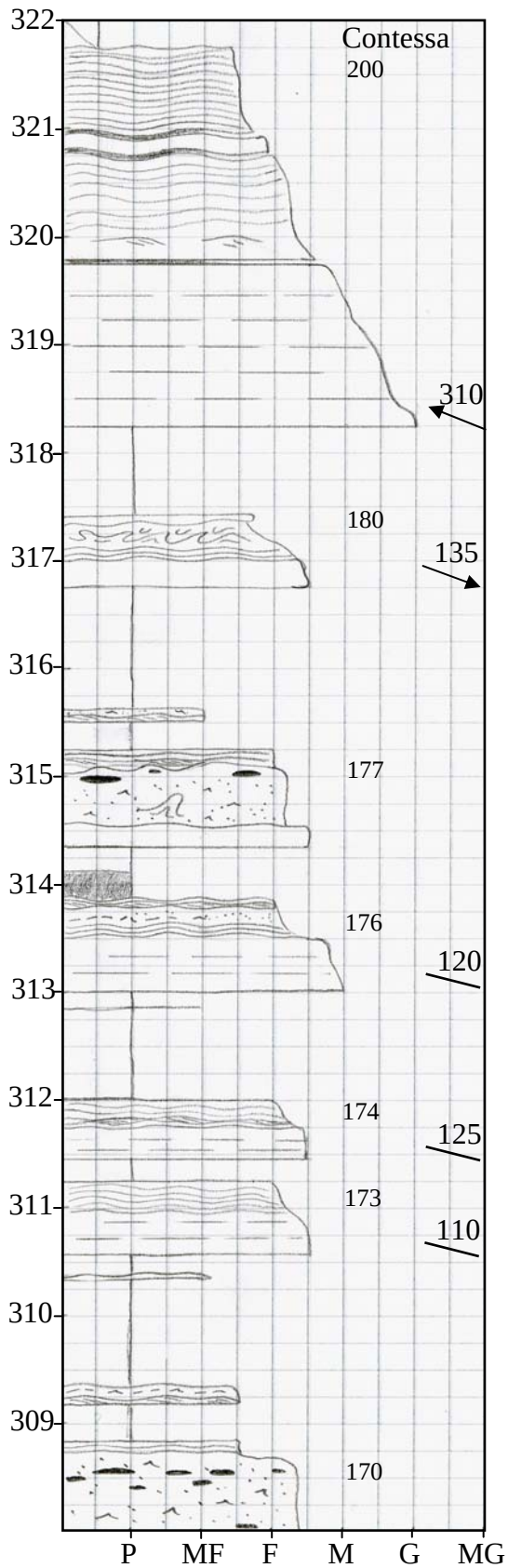
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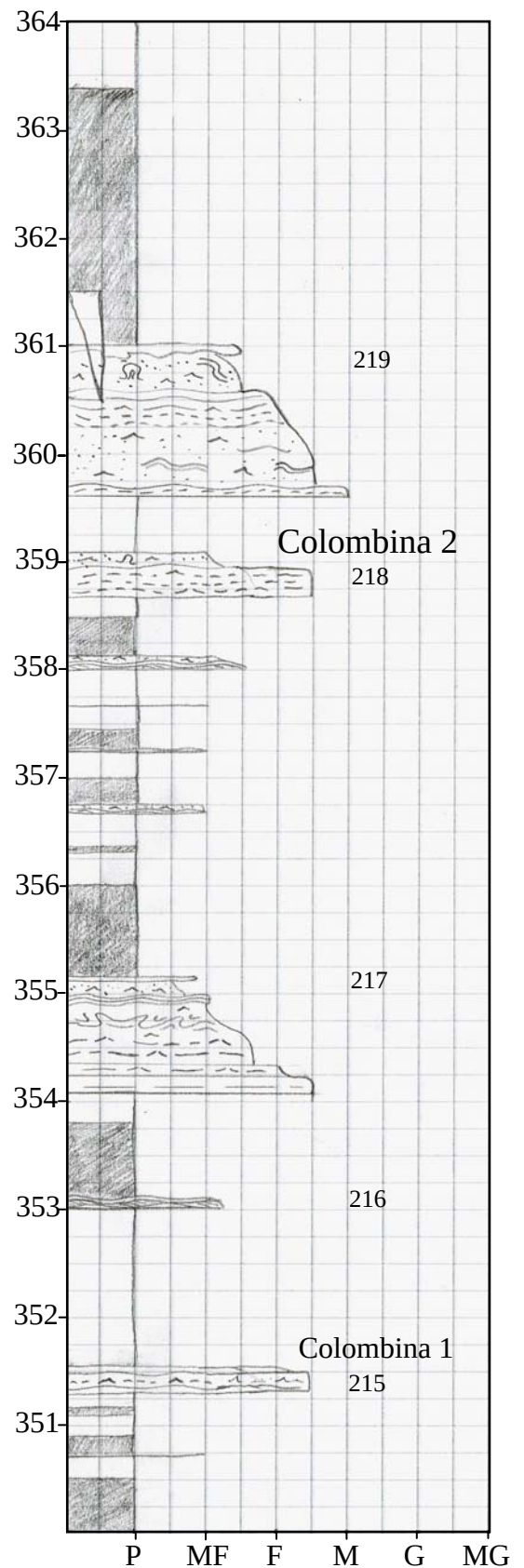
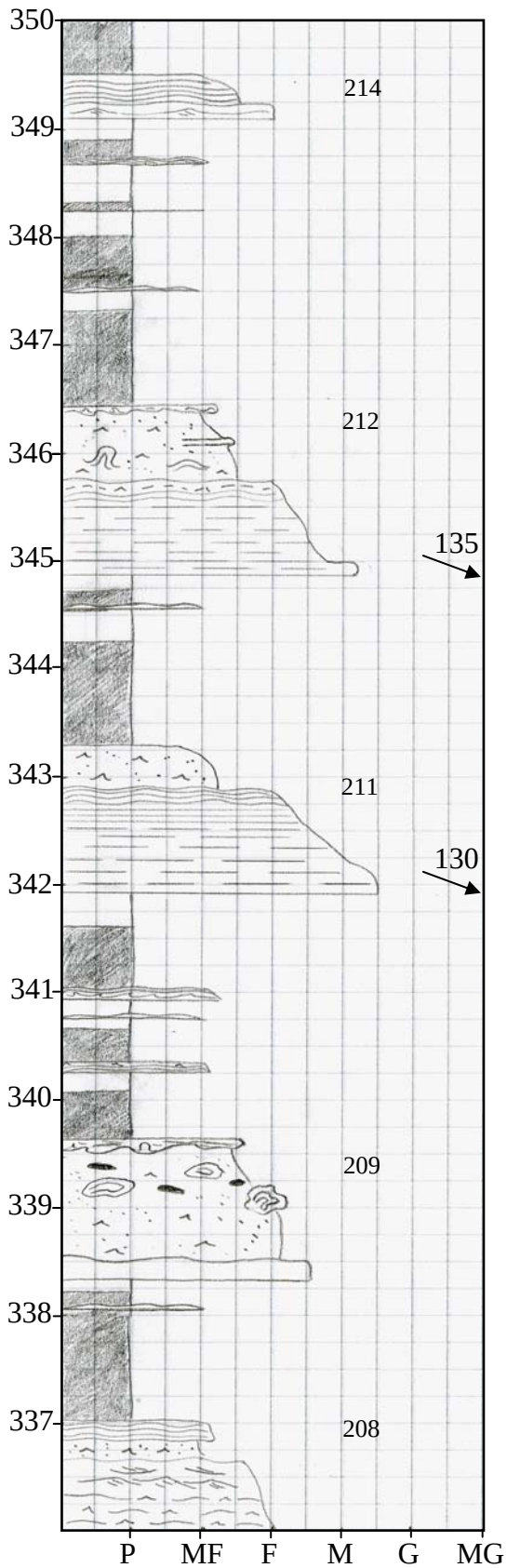
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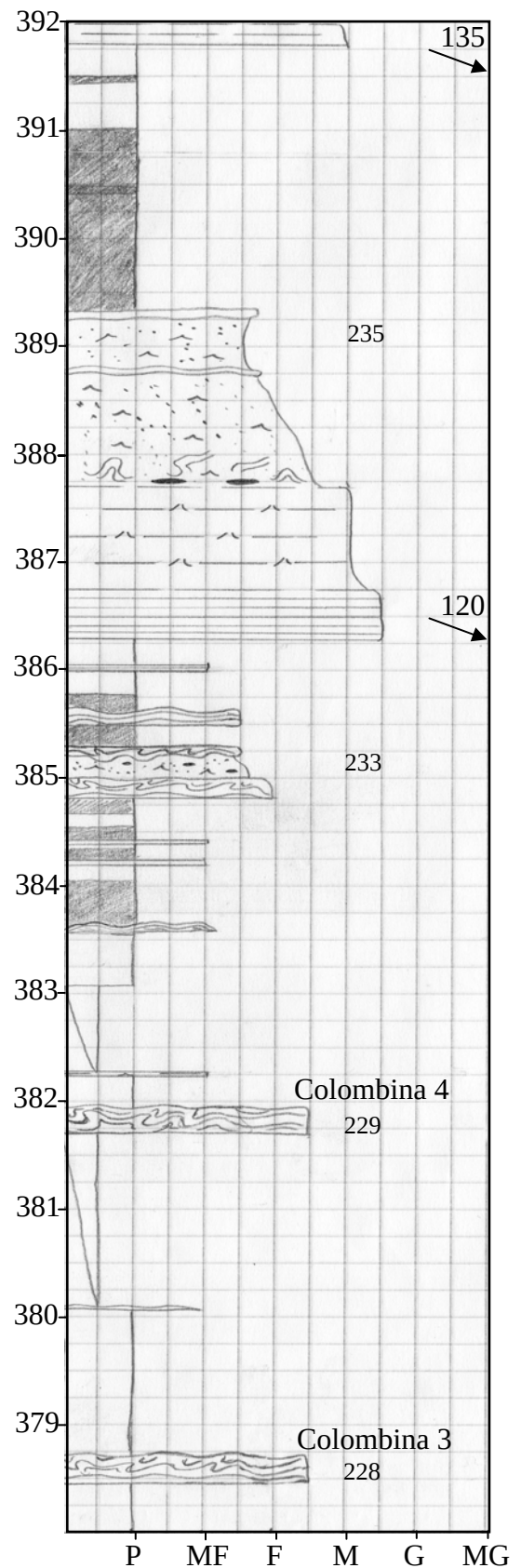
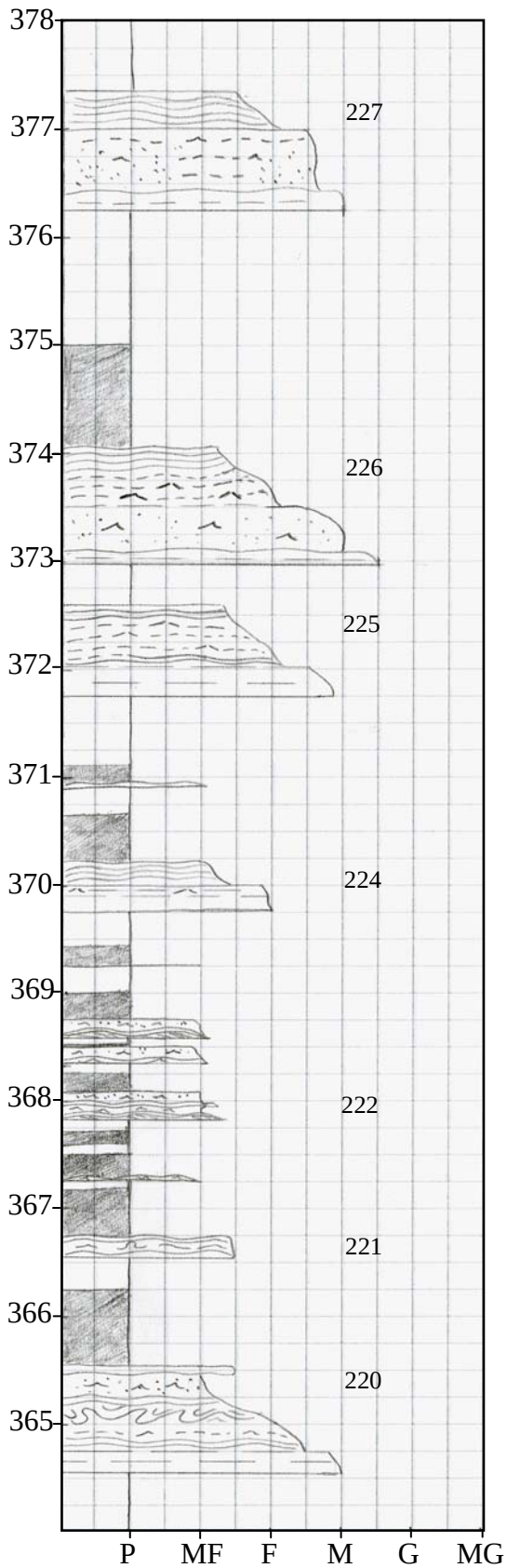
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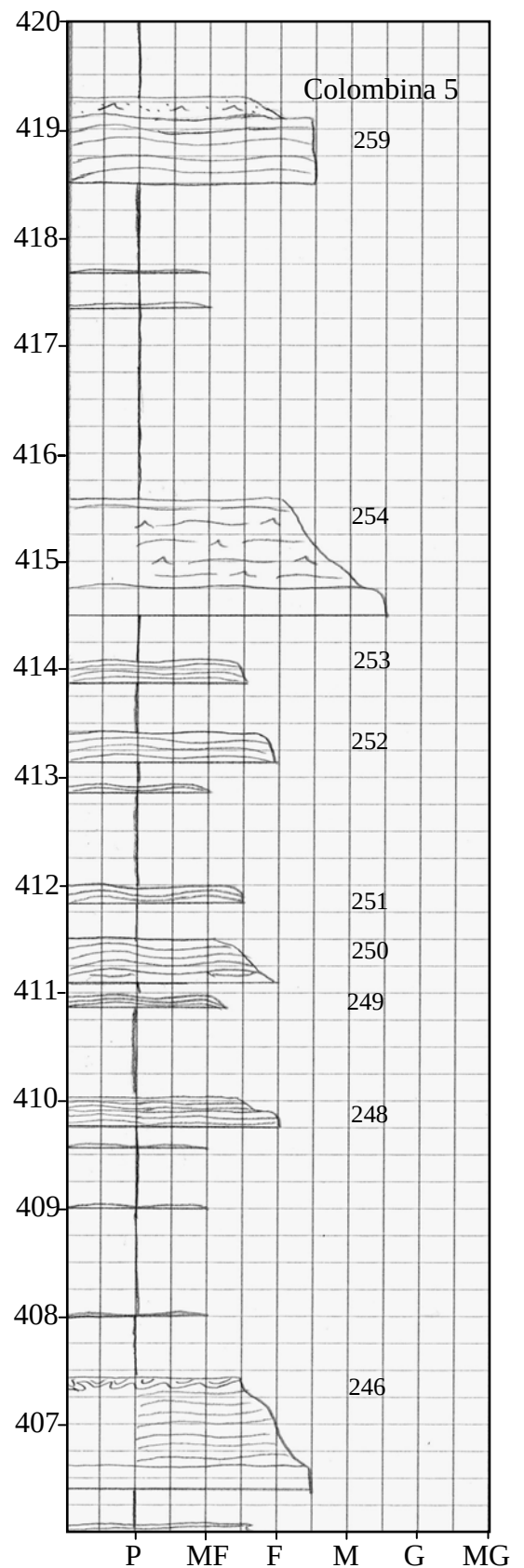
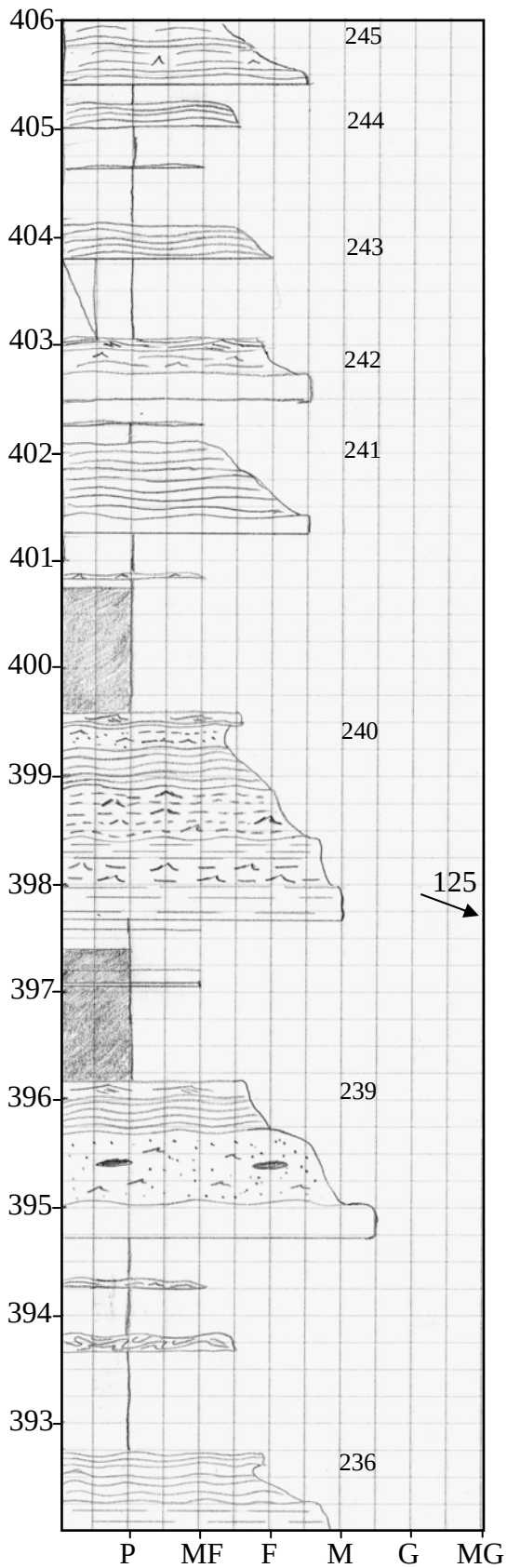
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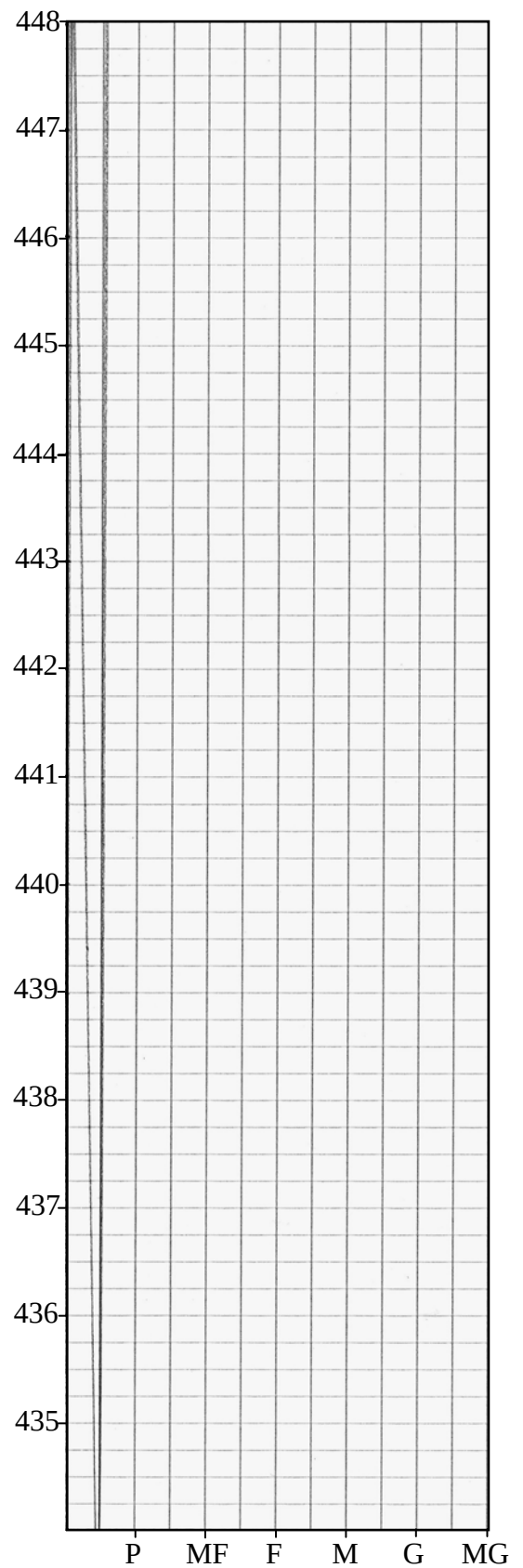
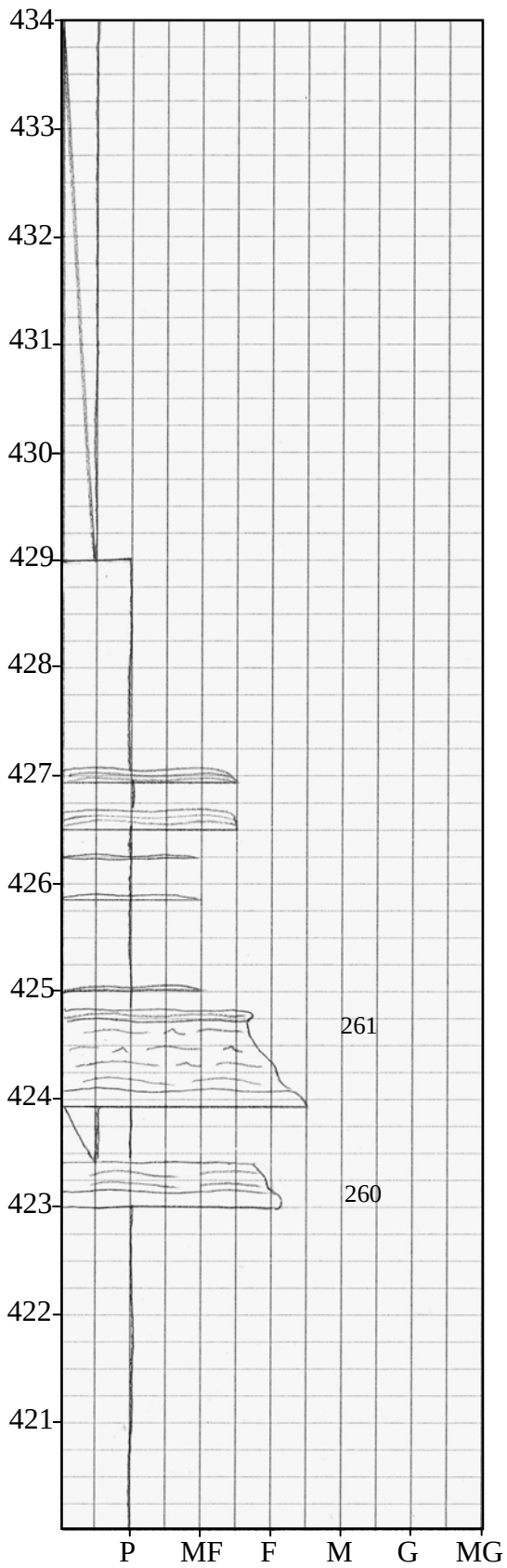
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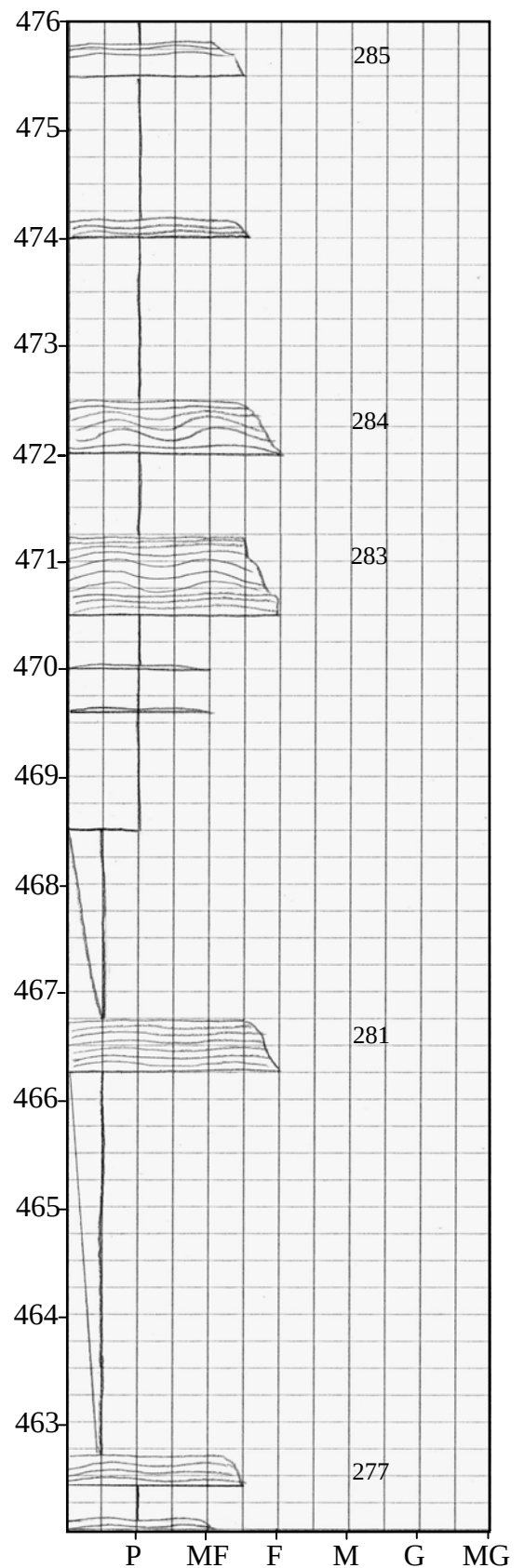
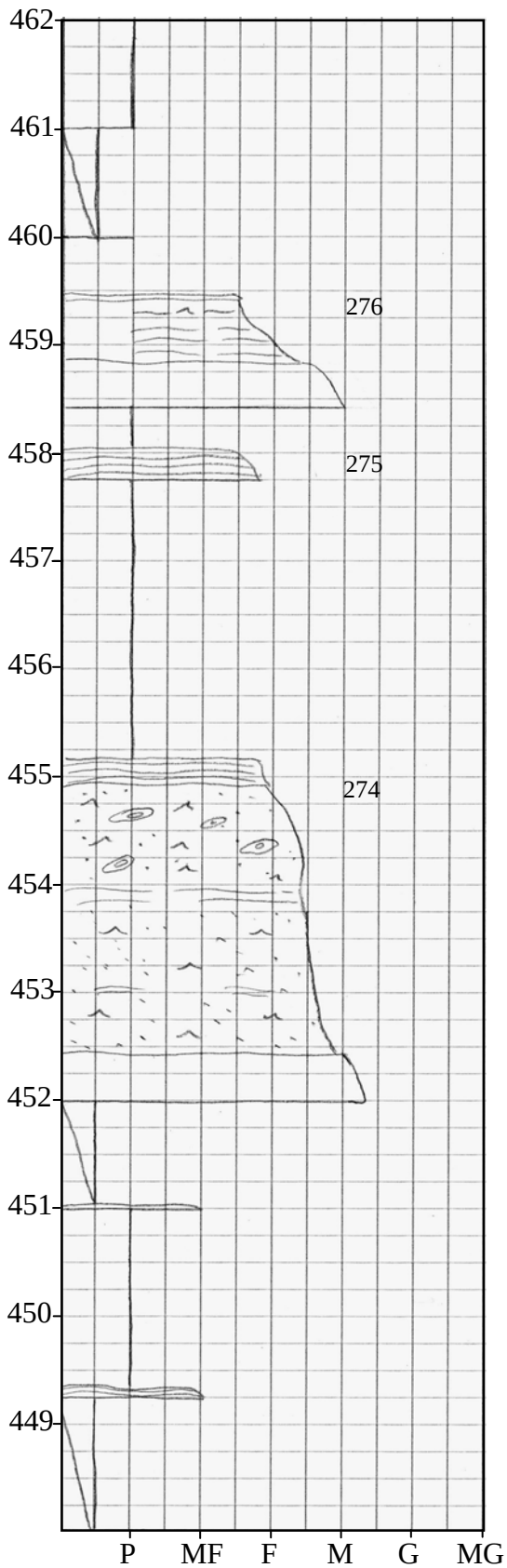
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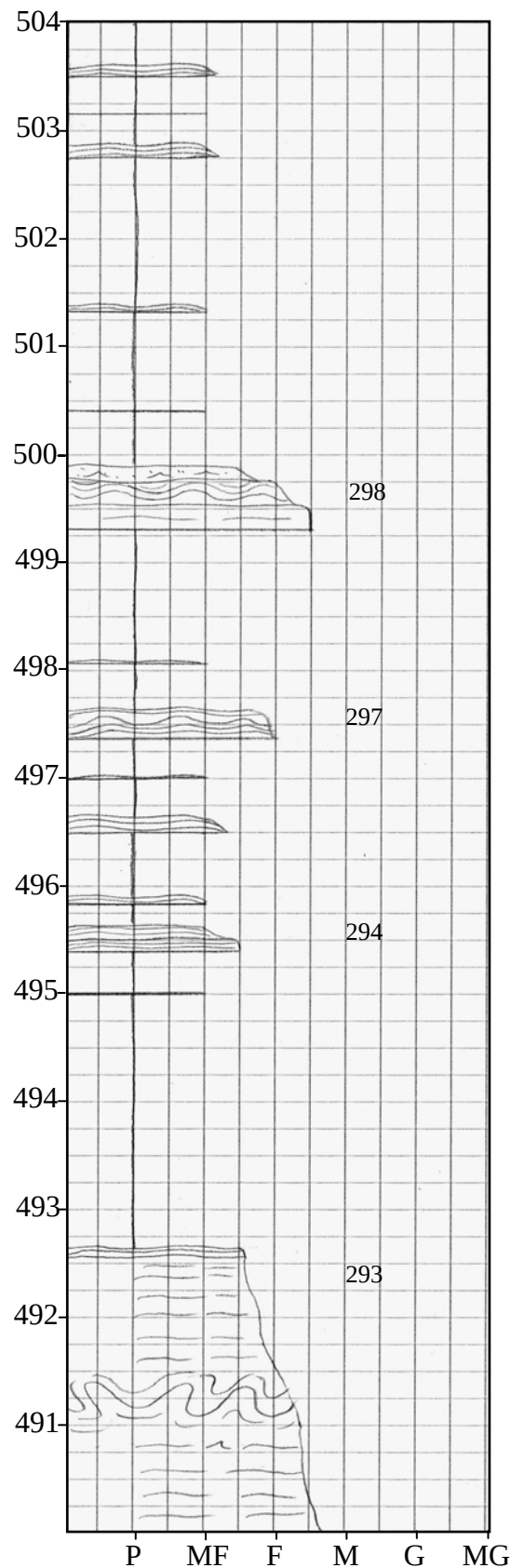
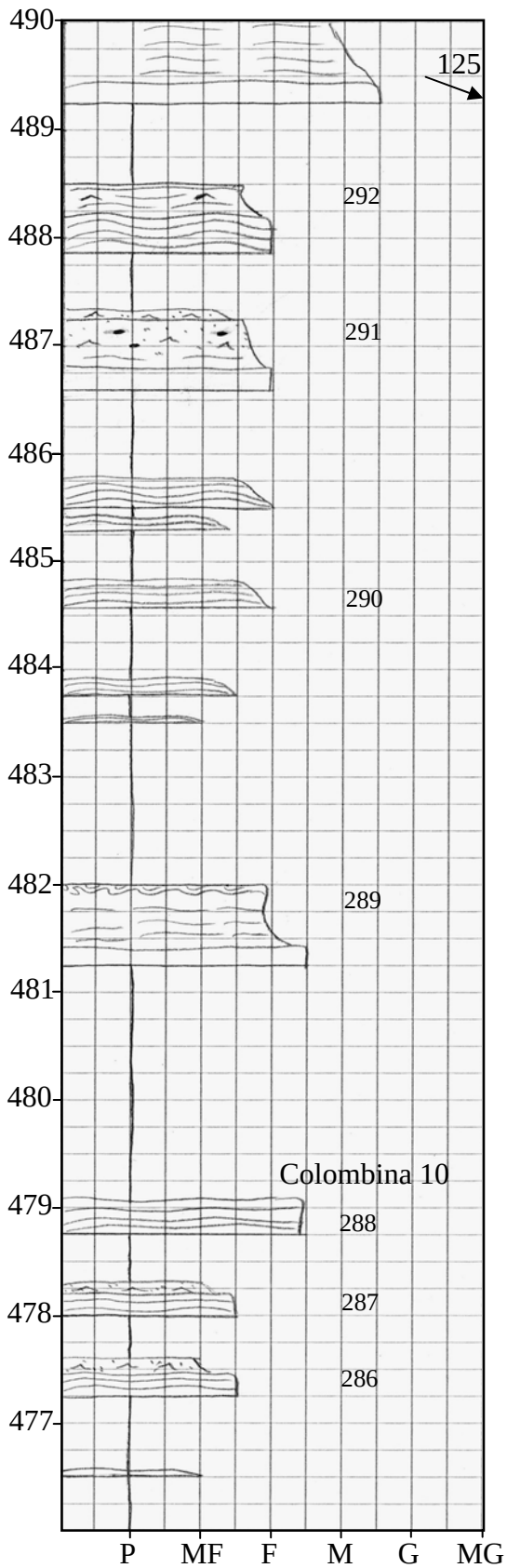
Sezione E



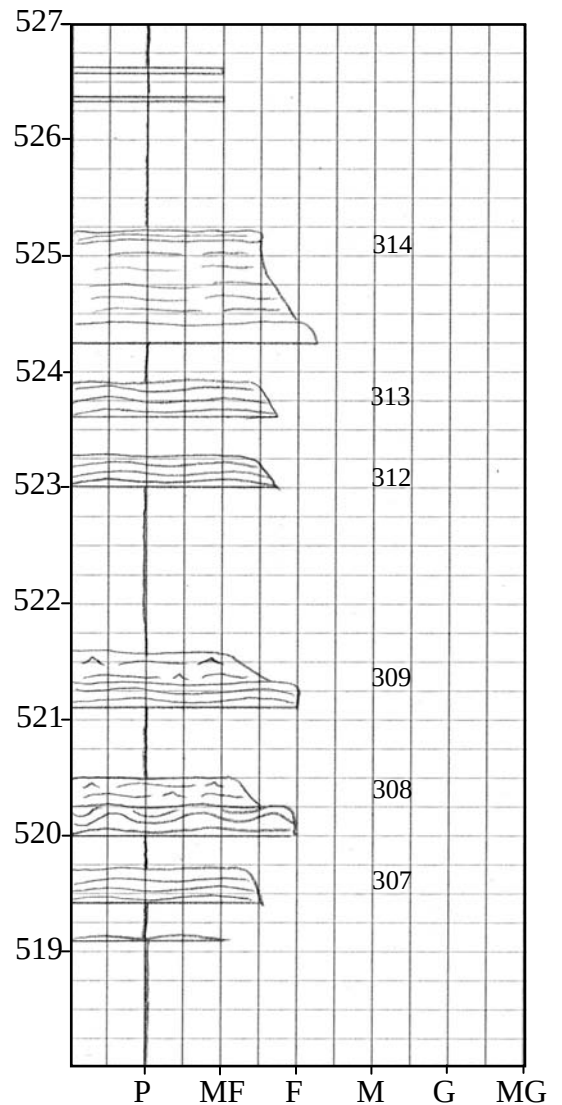
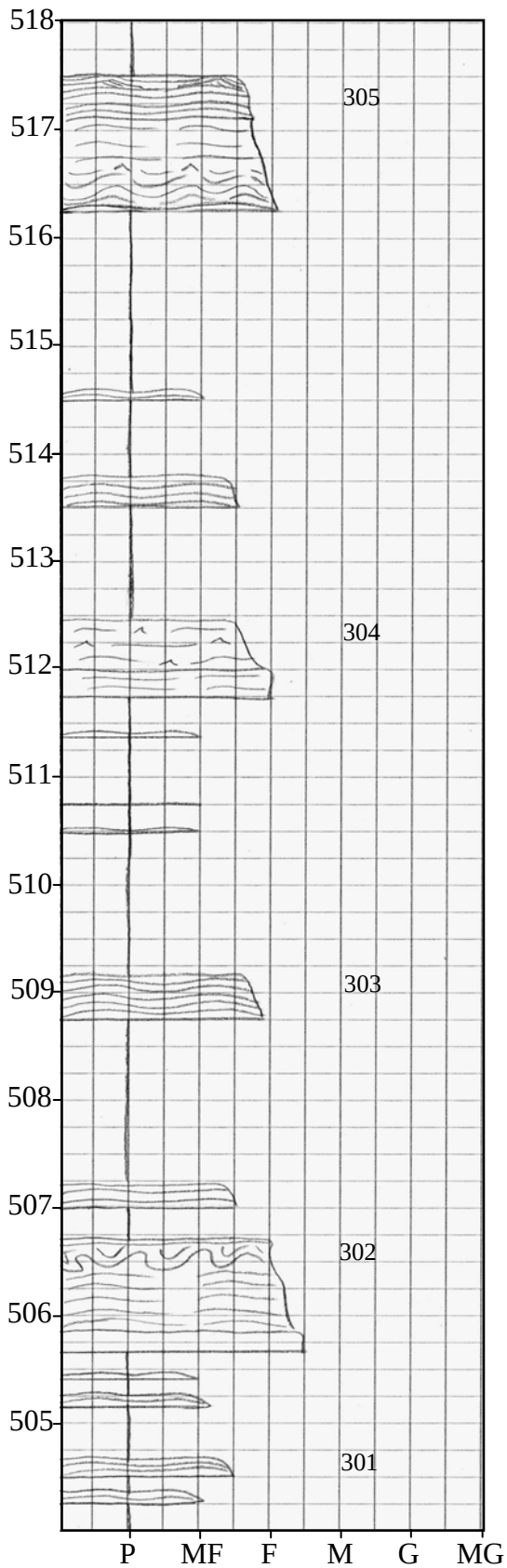
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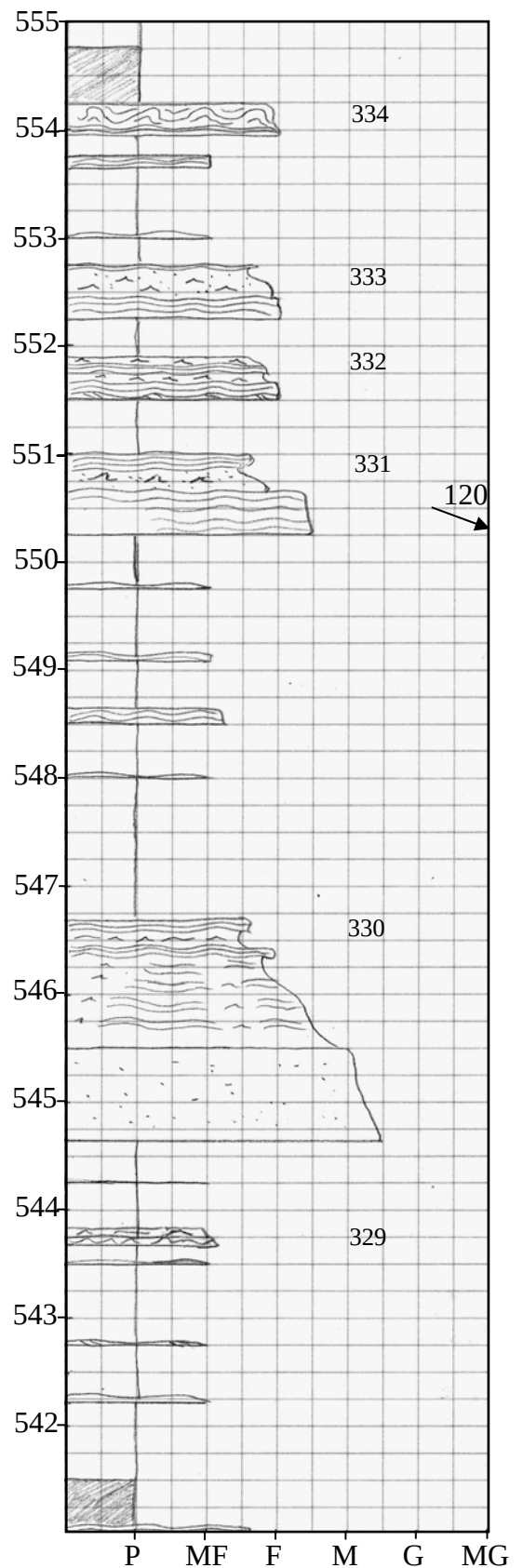
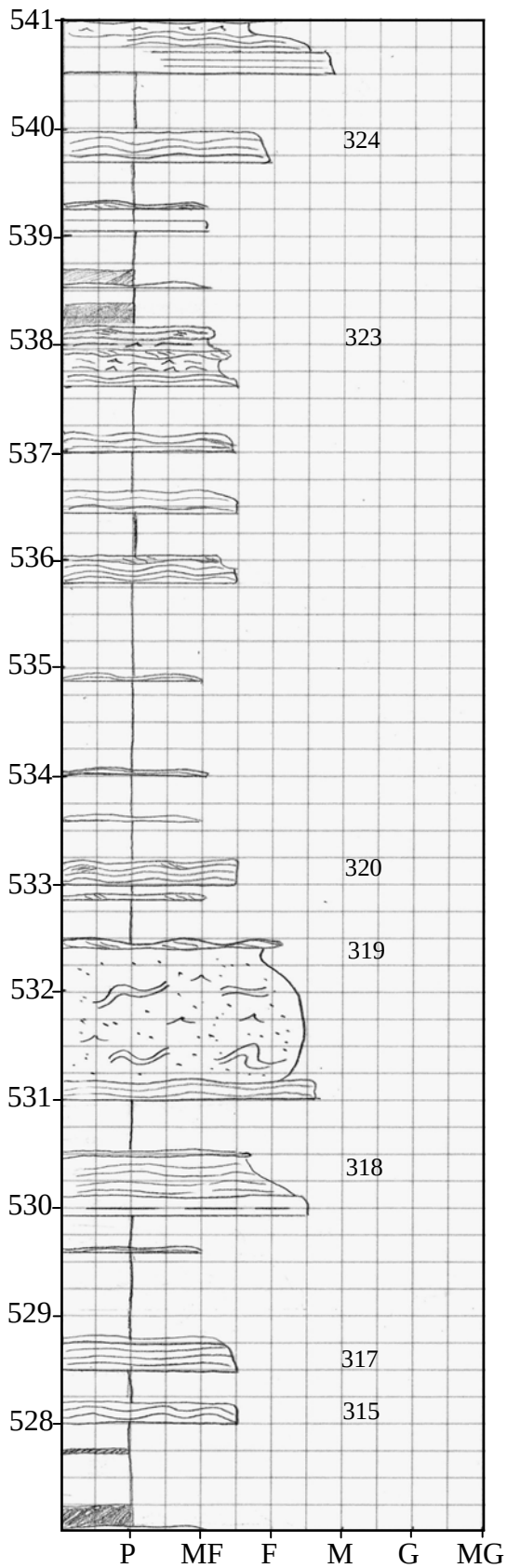
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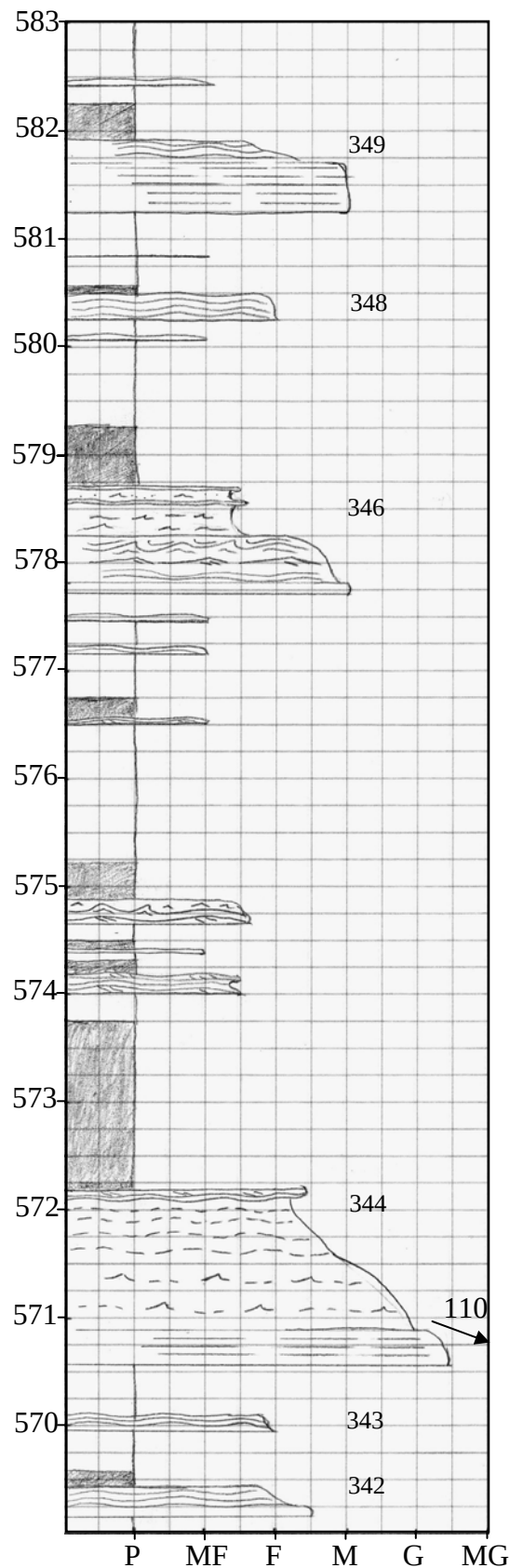
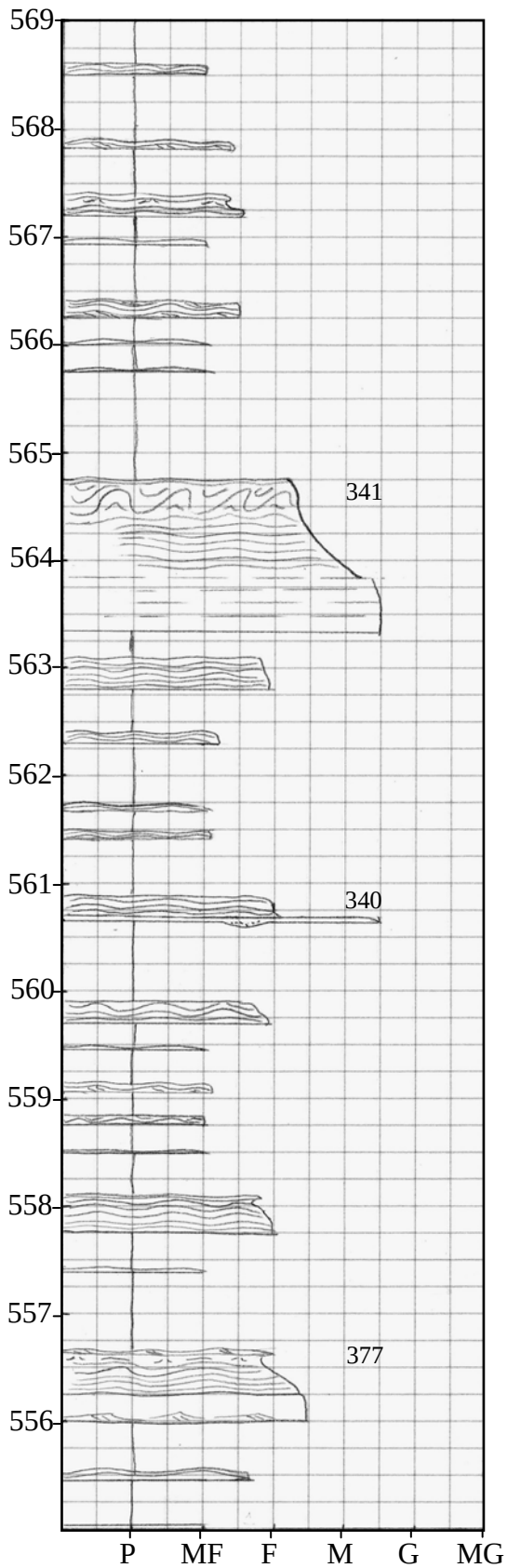
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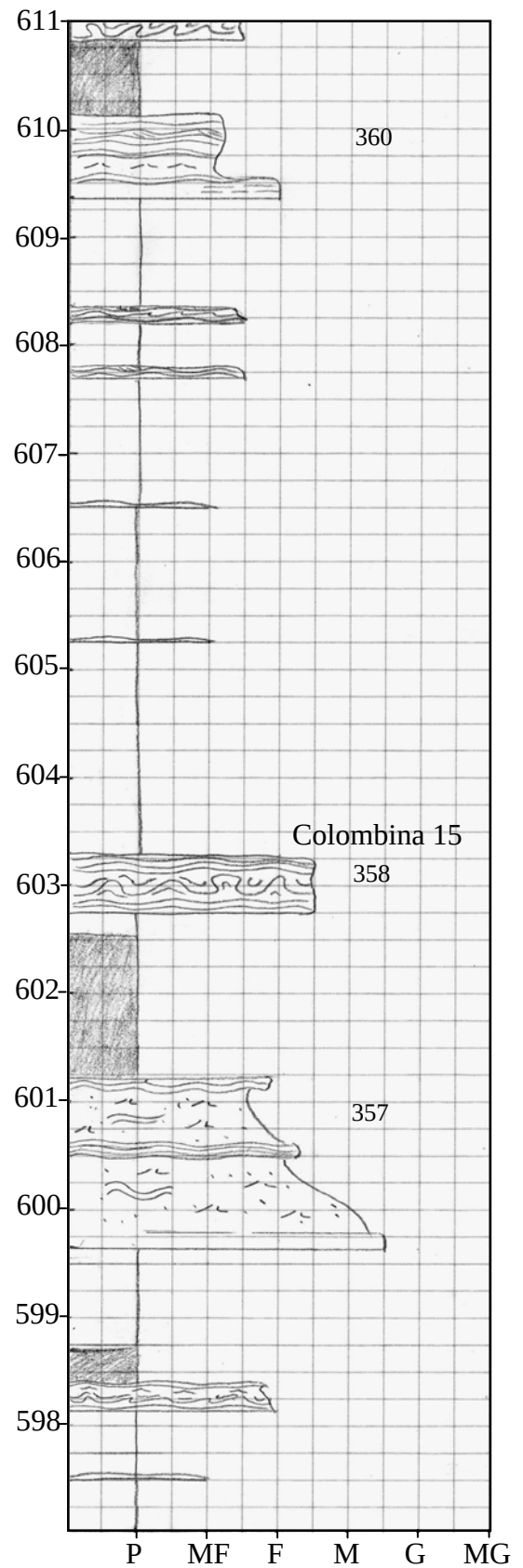
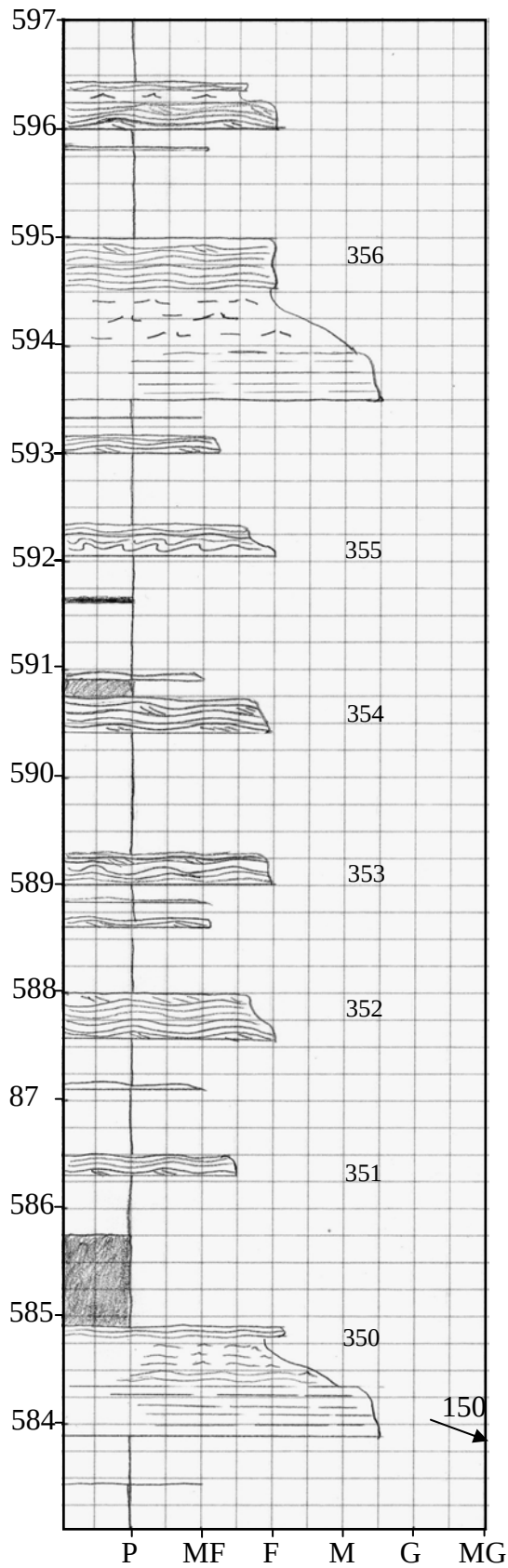
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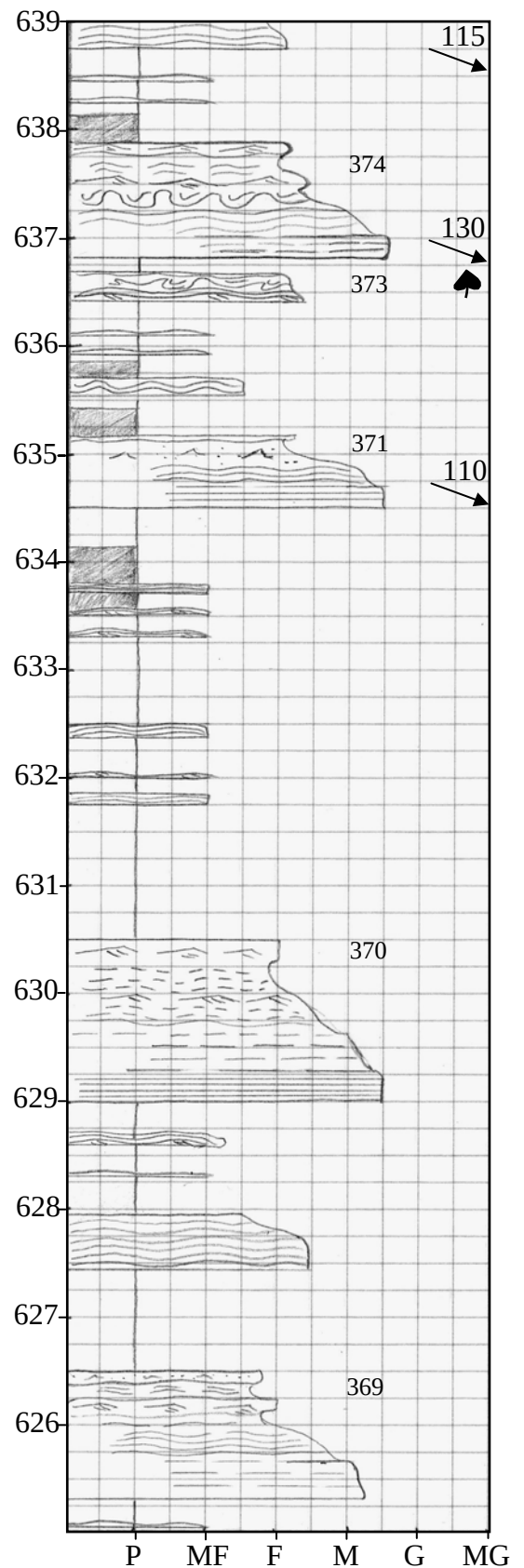
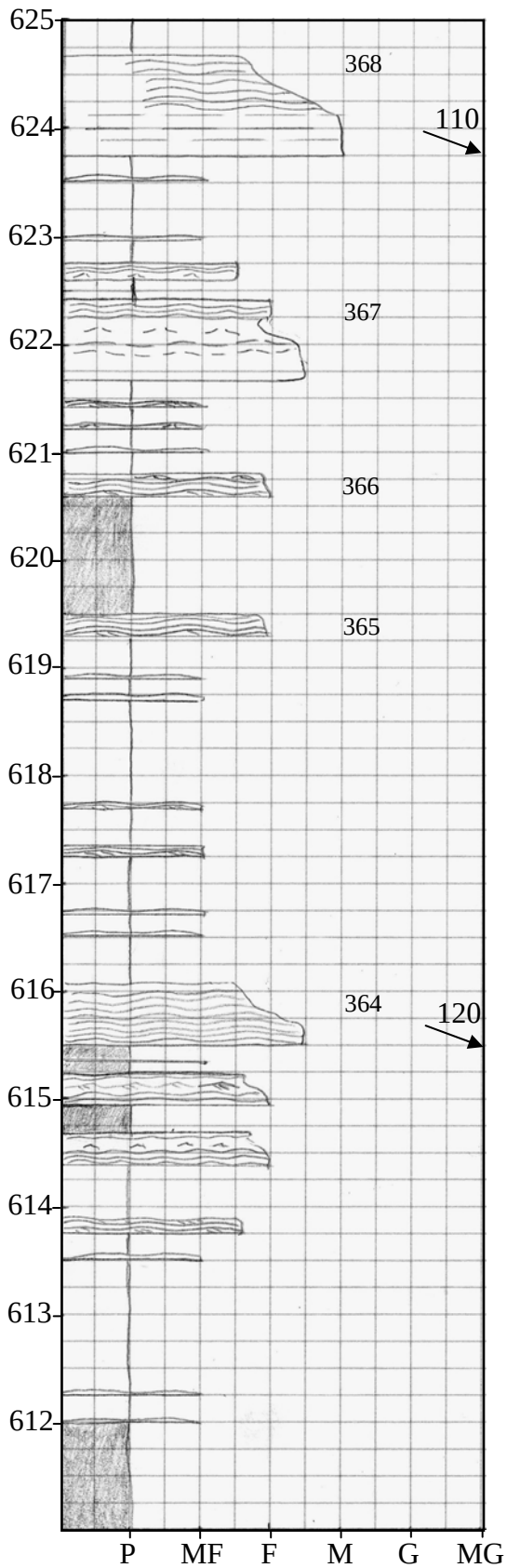
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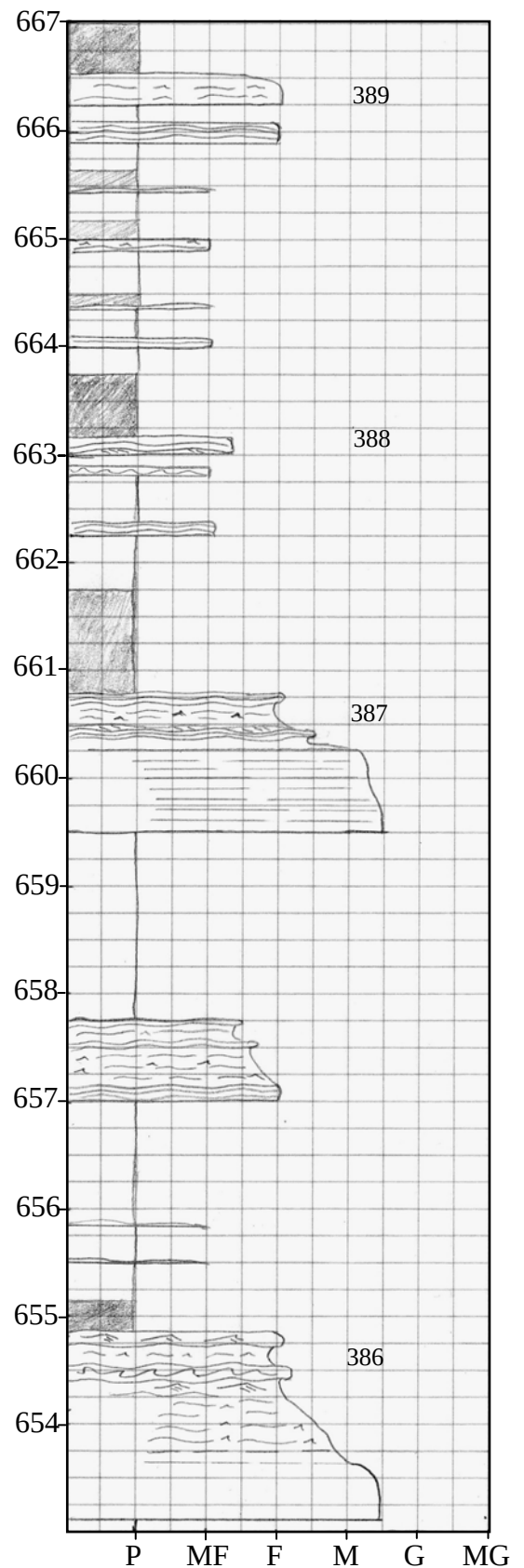
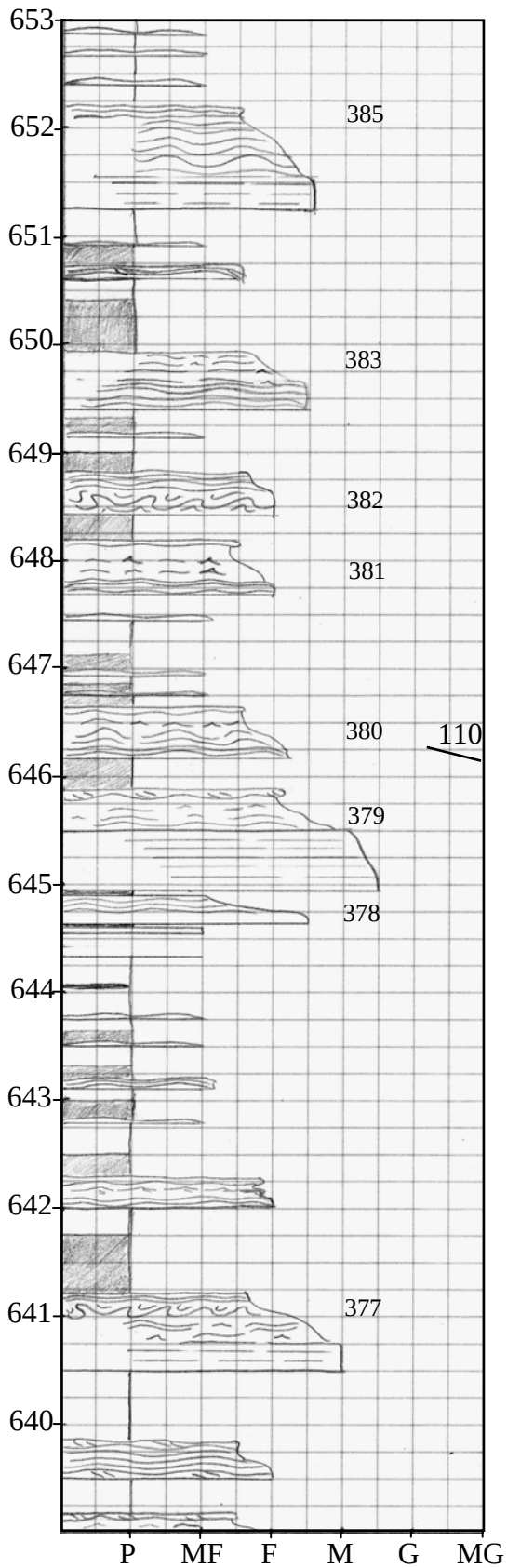
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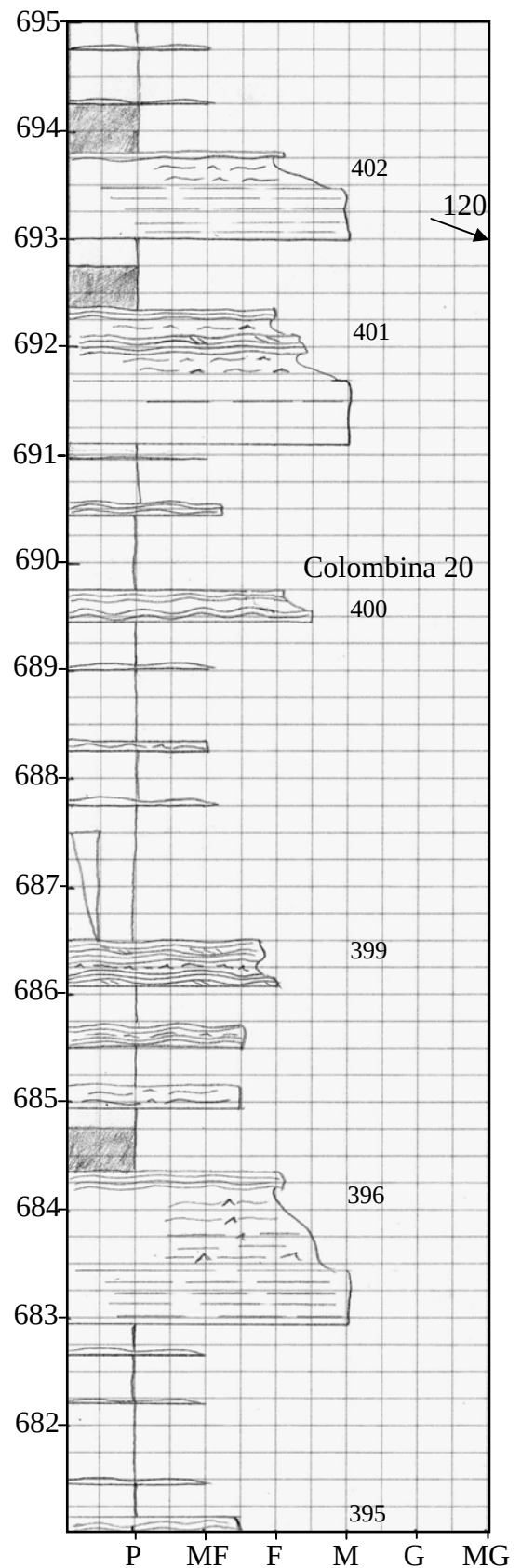
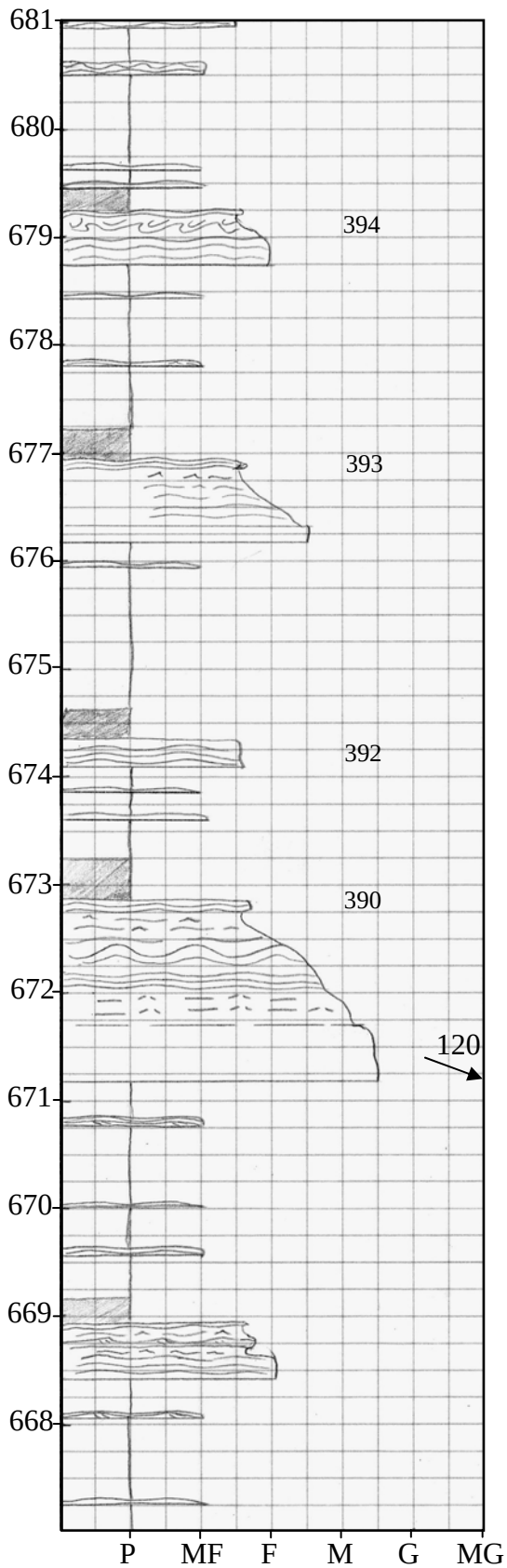
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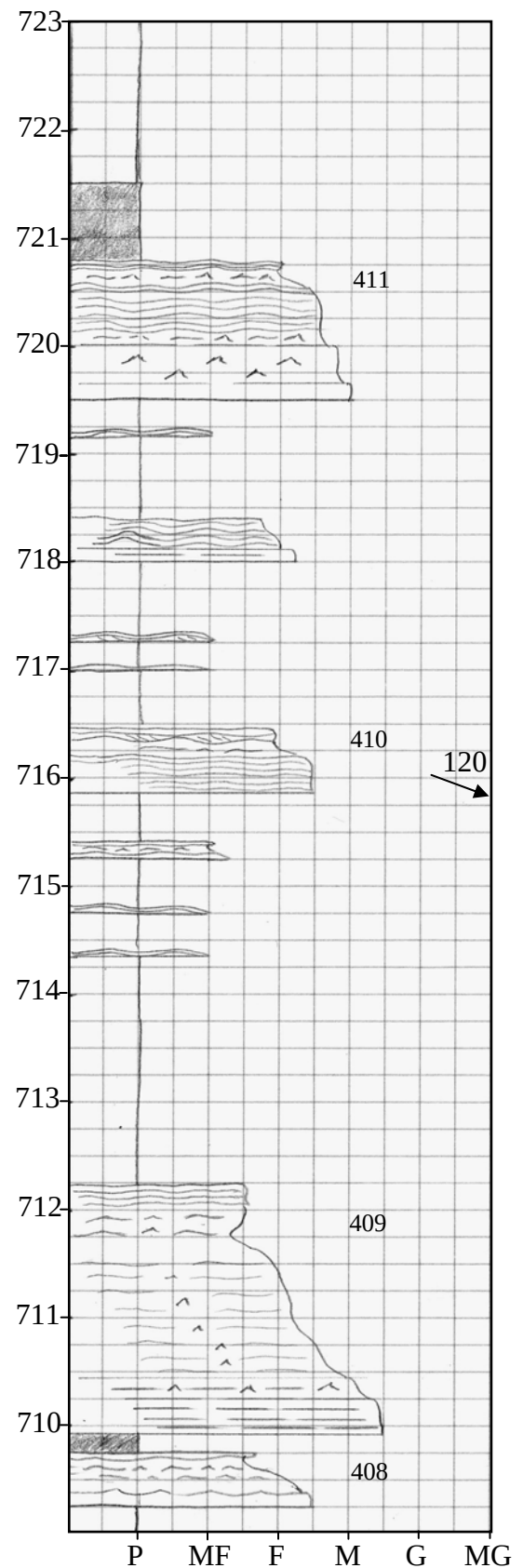
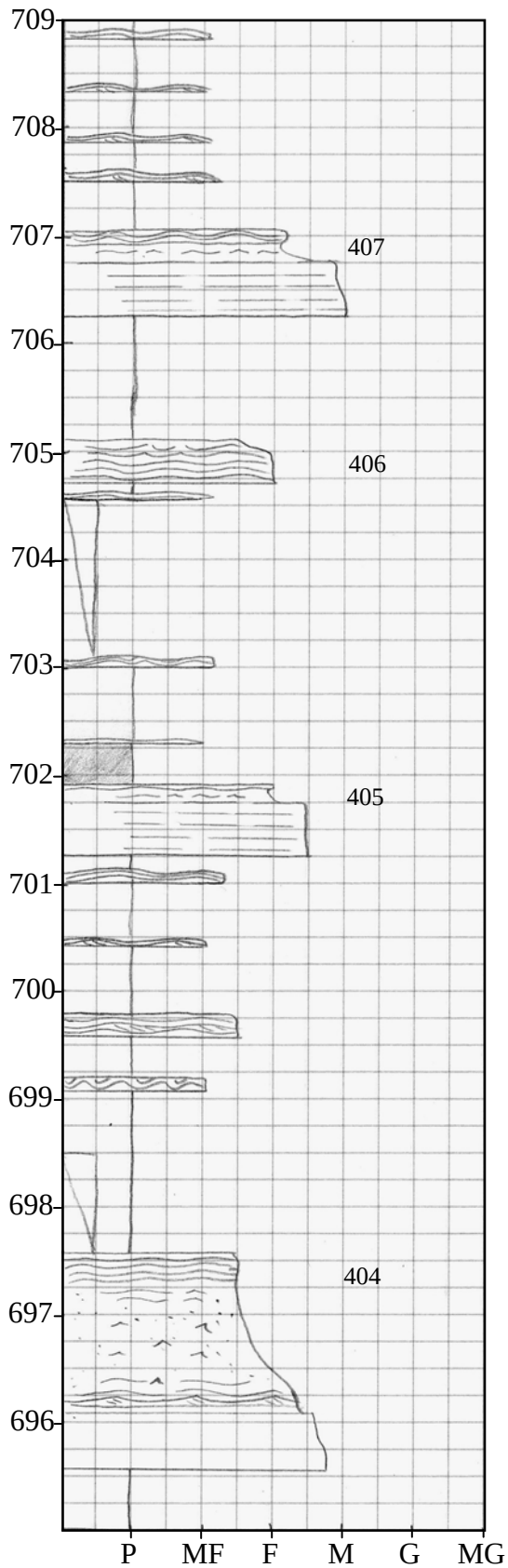
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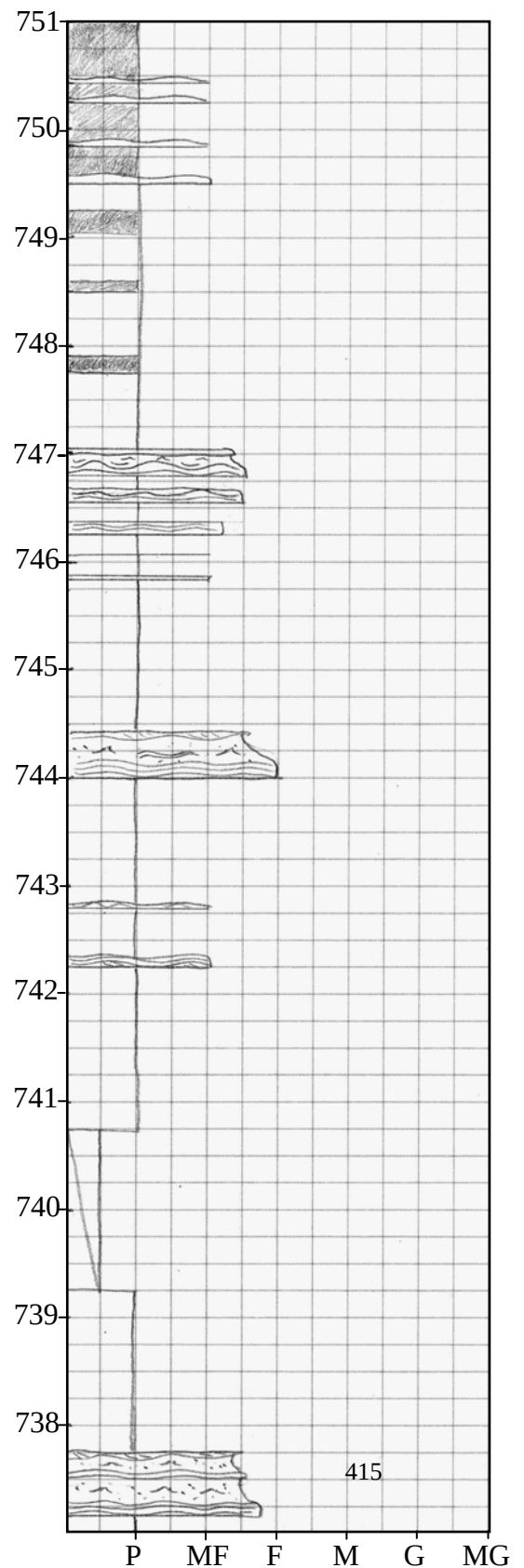
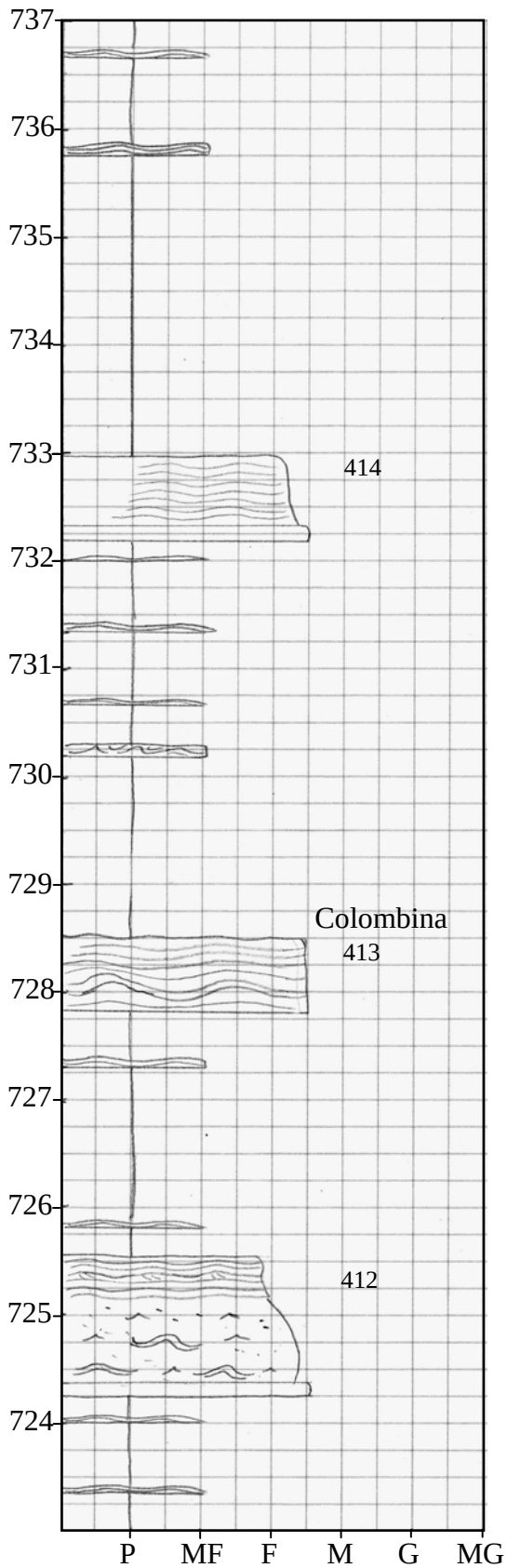
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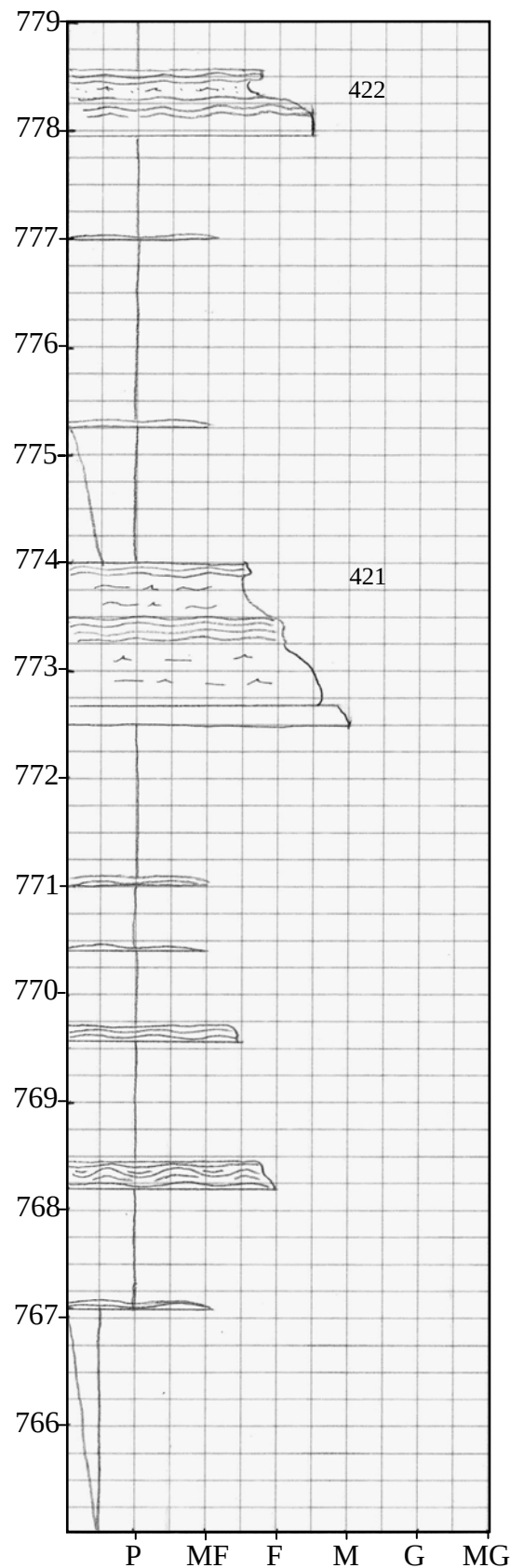
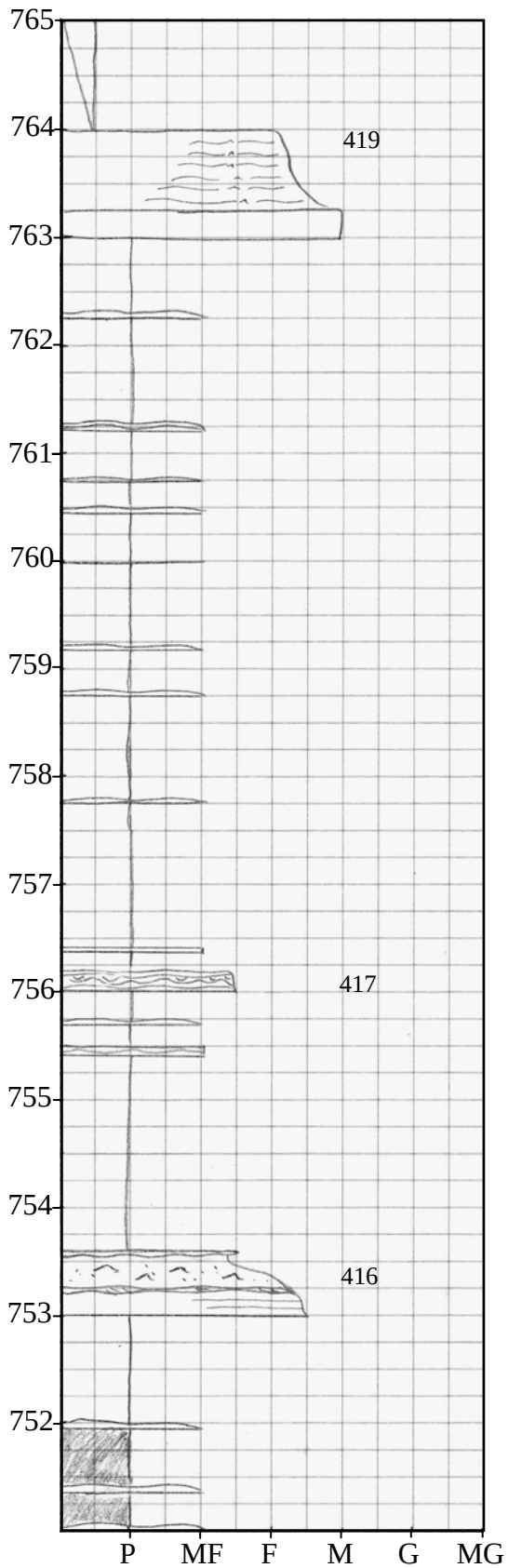
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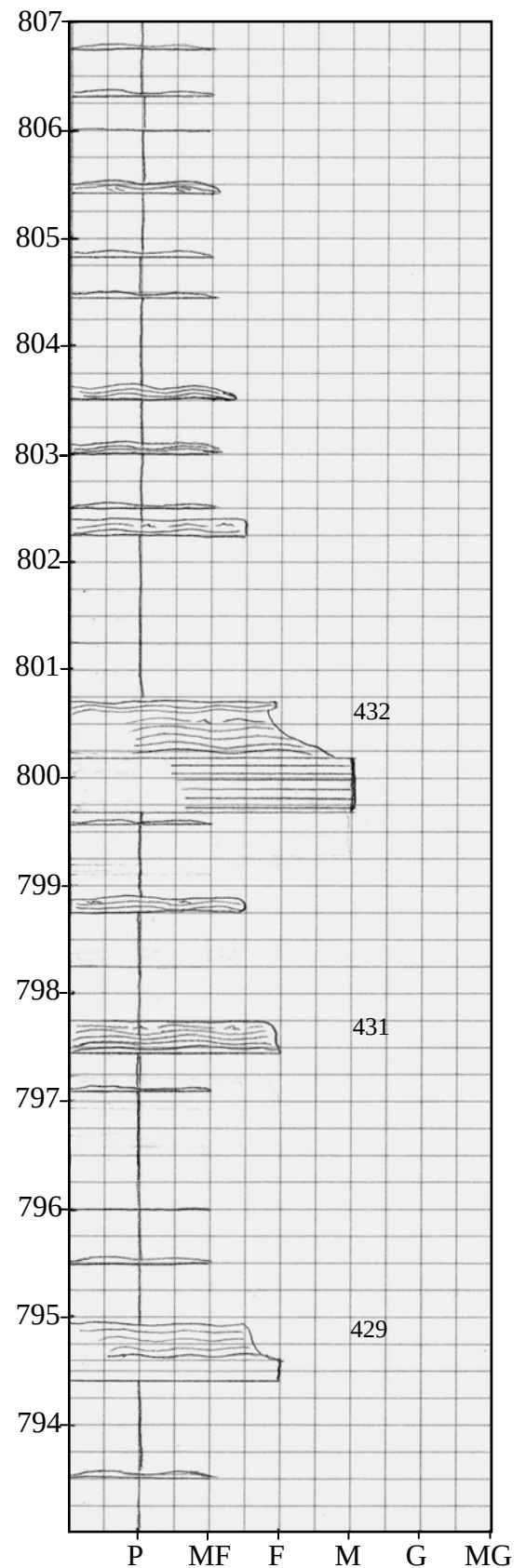
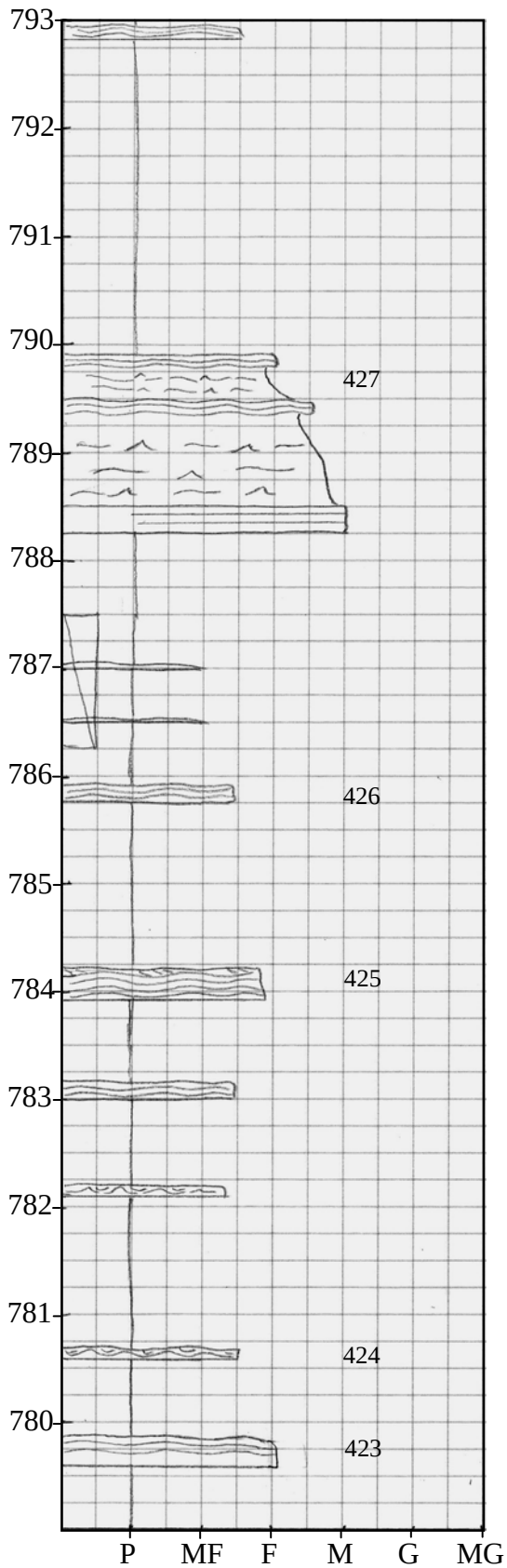
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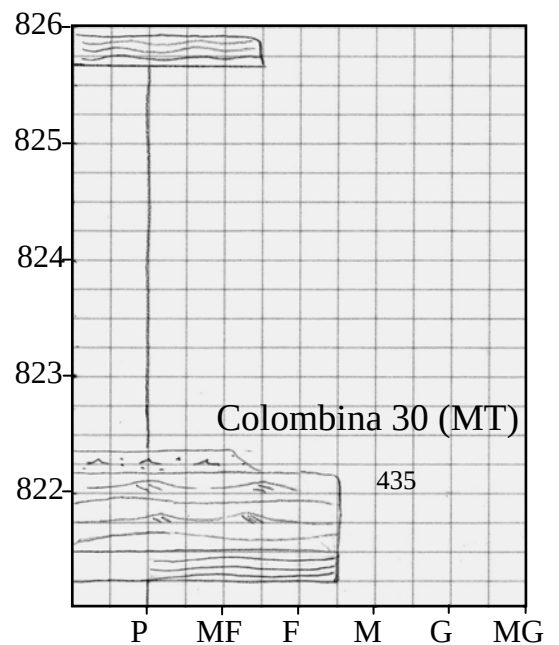
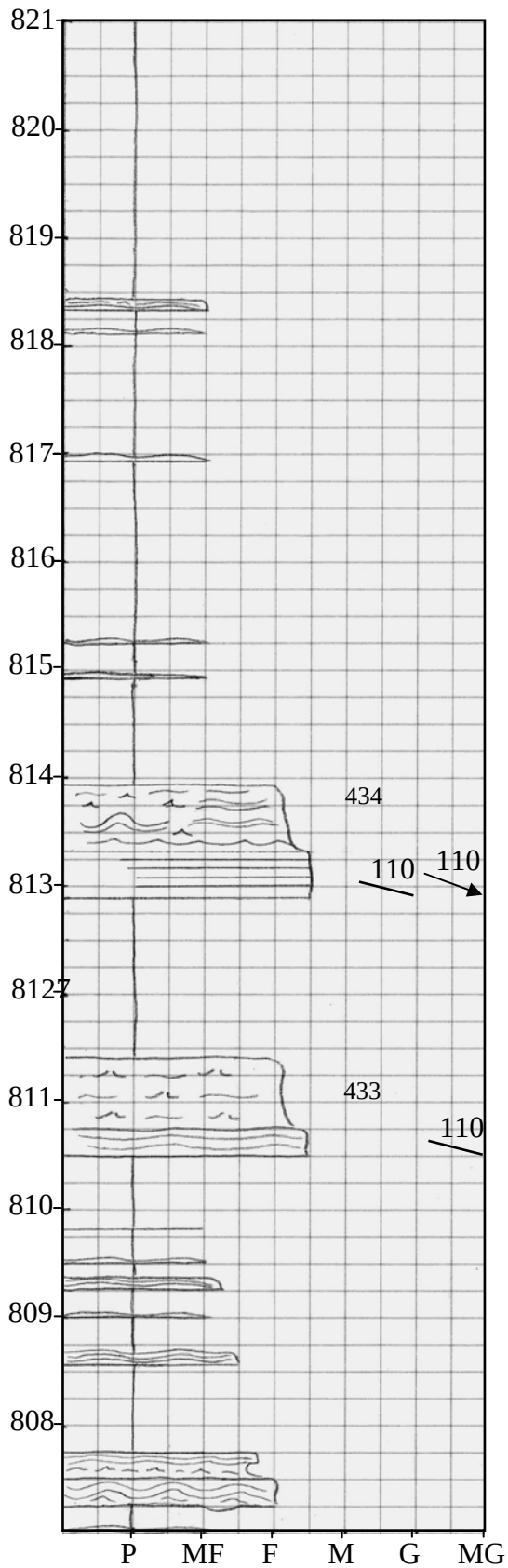
Sezione E



Sezione E



Sezione E



Sezione F

La base della sezione F si trova ubicata vicino al bivio tra le strade statali SS71 e FC137, a sud del Paese di Bagno di Romagna (Fig. 8). Questa sezione è spessa 1.155 m, ed è stata misurata quasi interamente lungo la strada SS71, a parte qualche tratto che è stato misurato lungo la strada FC137, come indicato nella figura 8. Lungo la FC137, infatti, sono stati misurati soltanto alcune centinaia di metri relativi alla porzione basale della sezione, oltre a due brevi tratti al di sotto dello strato guida Contessa e al di sopra dello strato guida Colombina 5. Al contrario lungo la statale SS71 la successione affiora molto bene fino al Caotico di Nasseto, che compare nella località di Recetto, nei pressi del Passo dei Mandrioli.

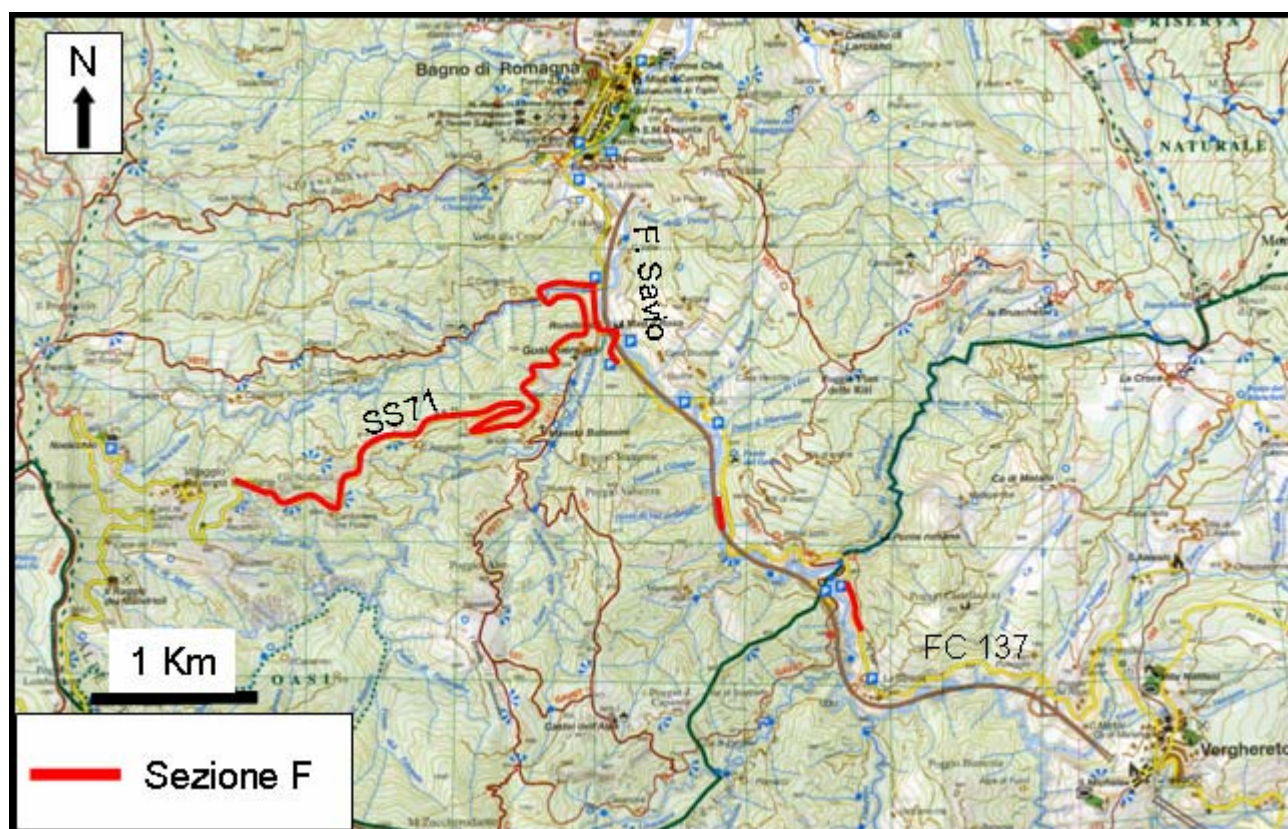
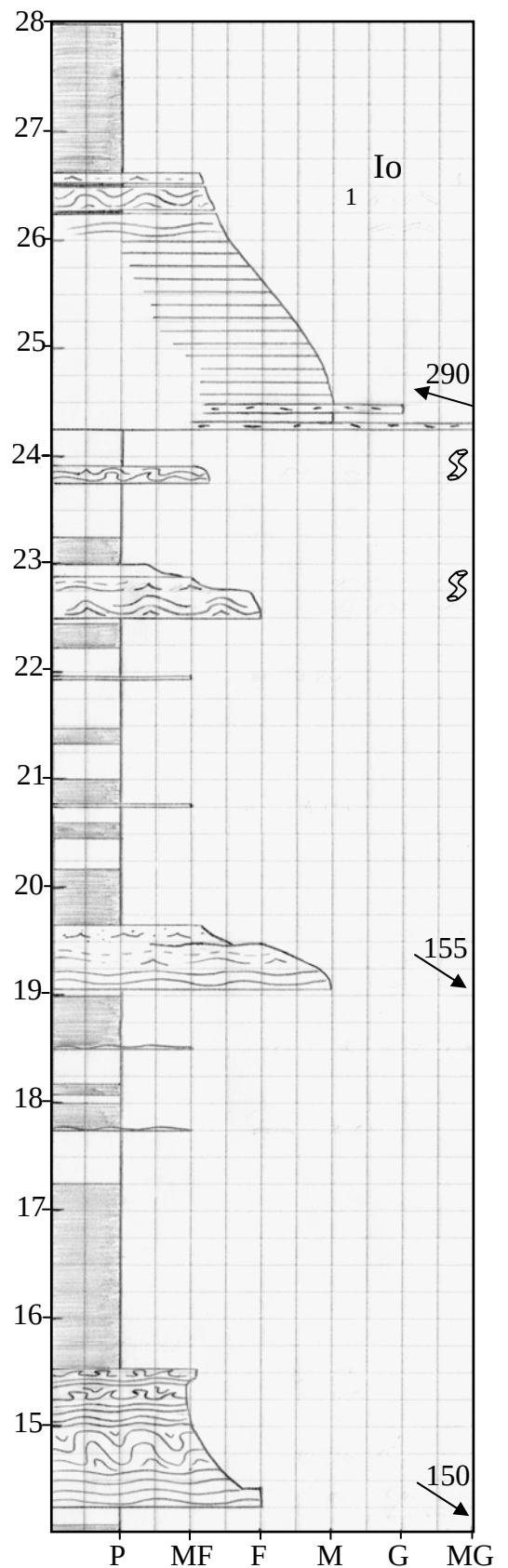
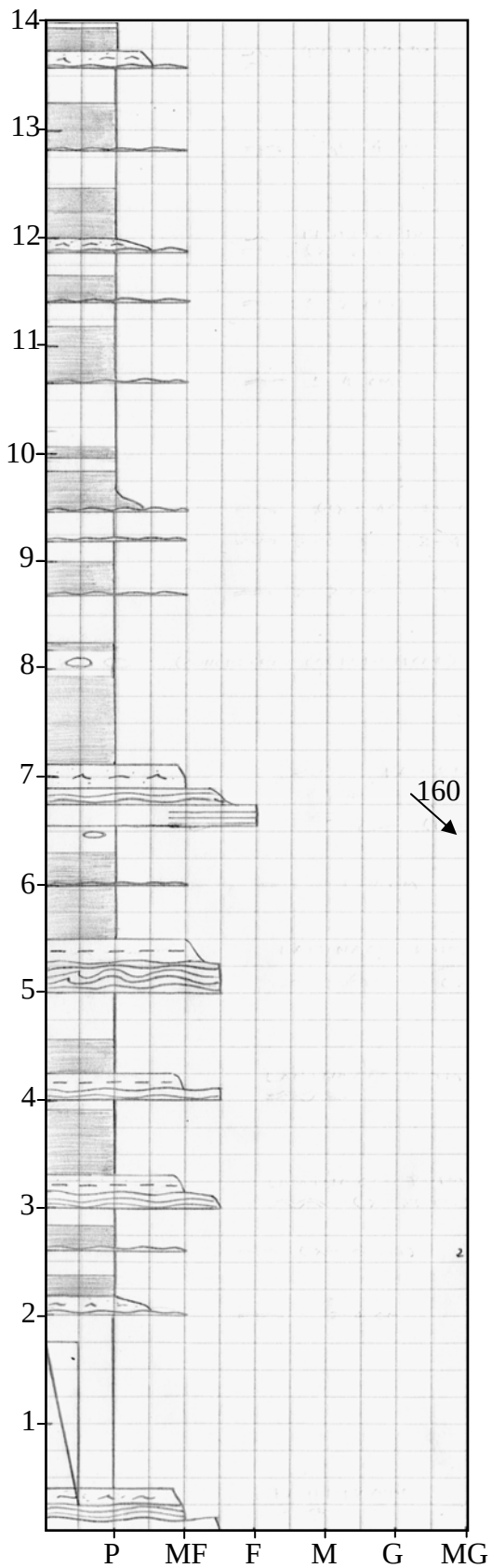
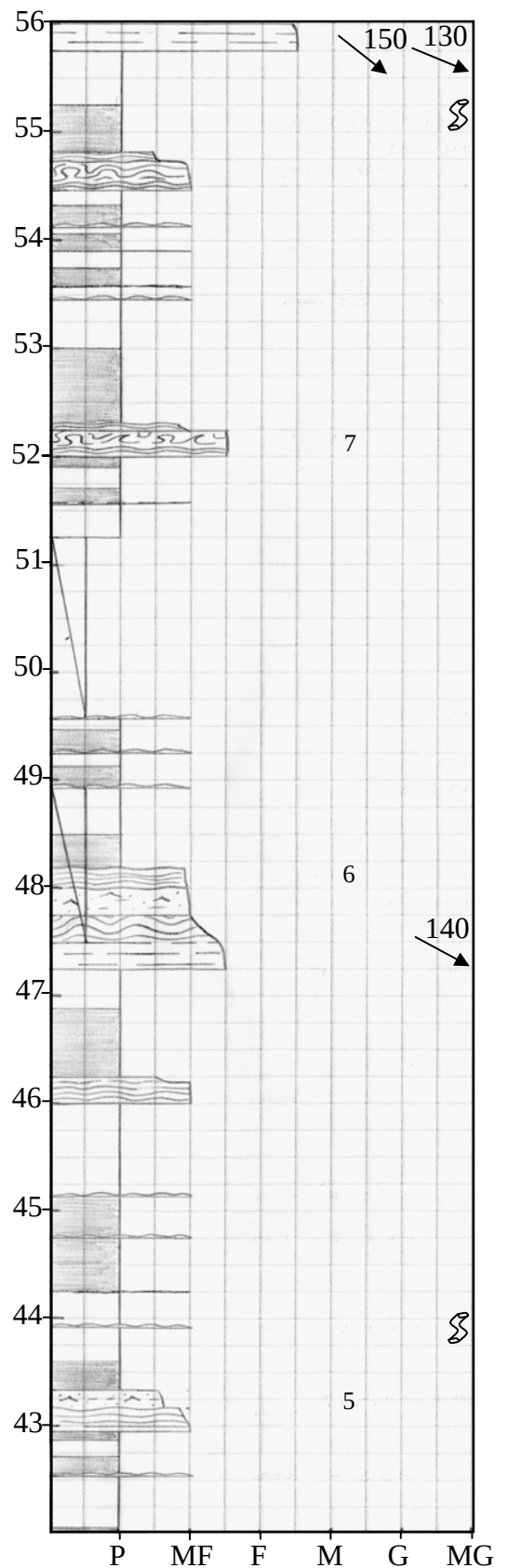
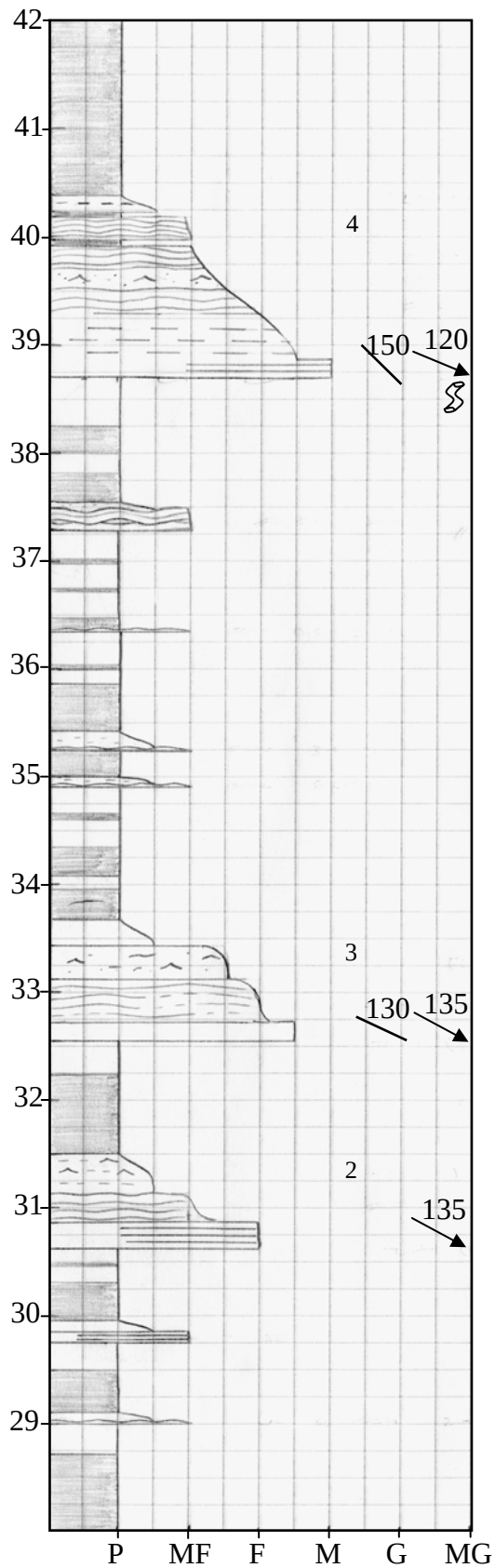


Figura 8- Mappa di localizzazione della sezione F, Valle del Savio.

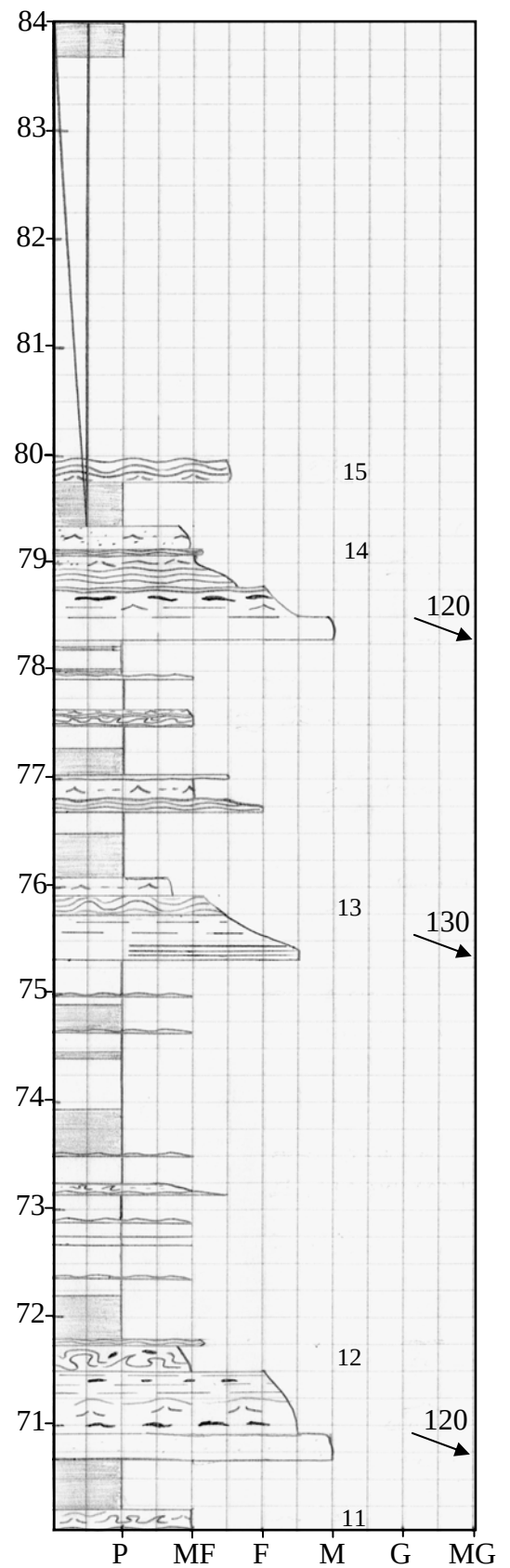
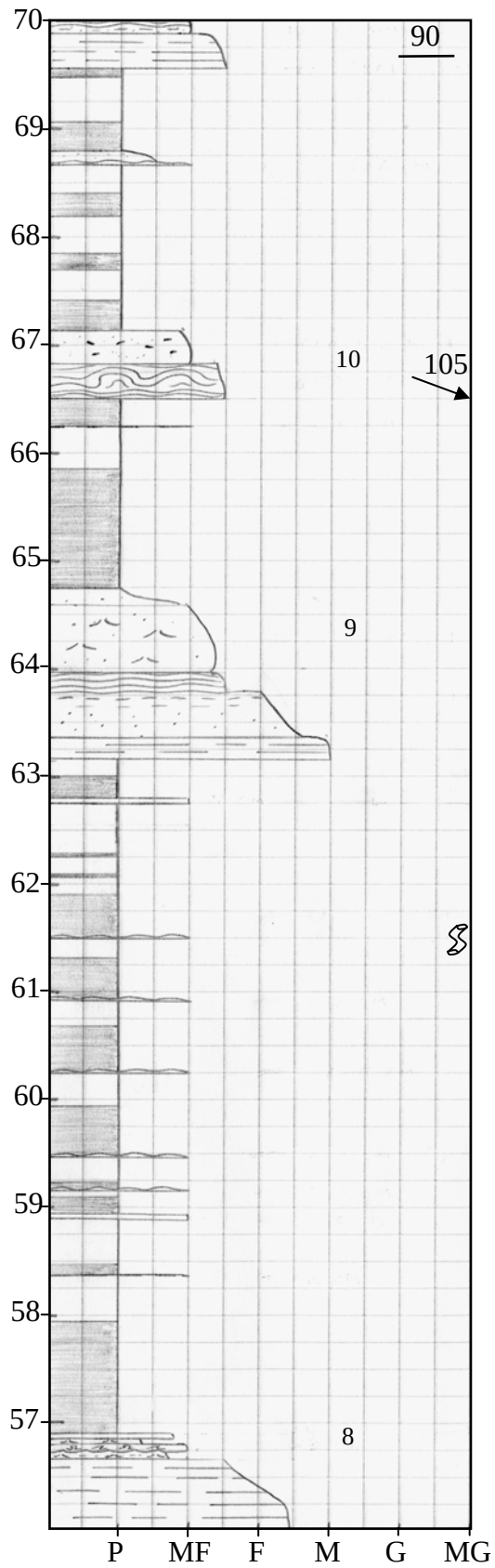
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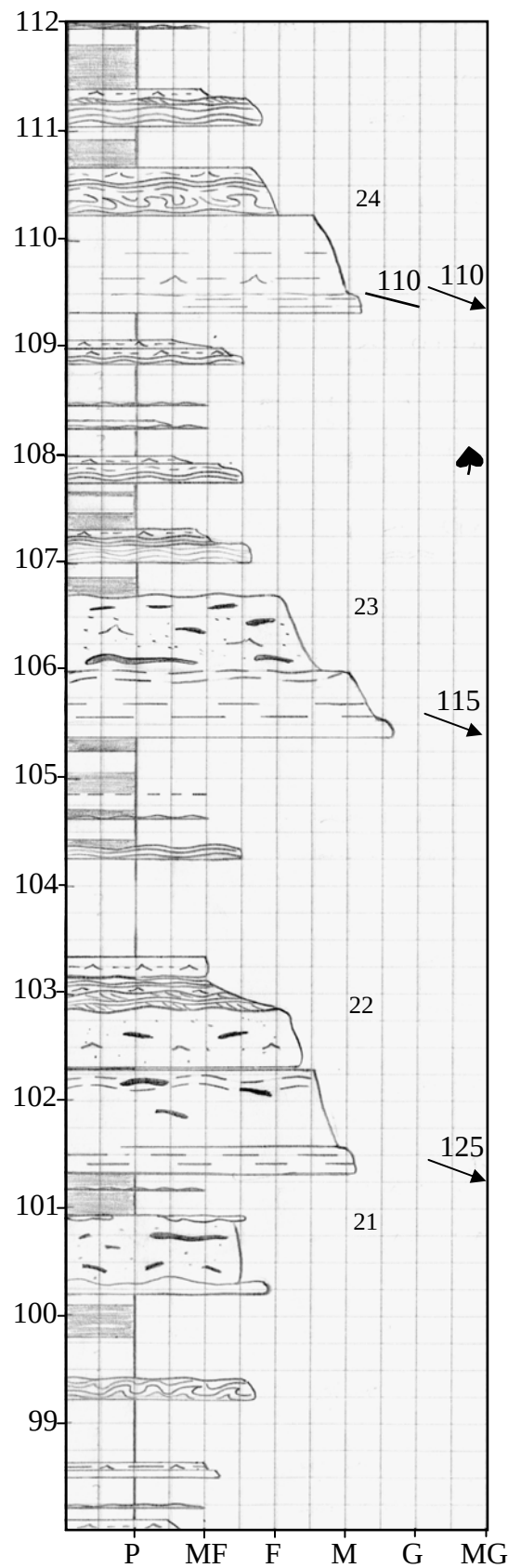
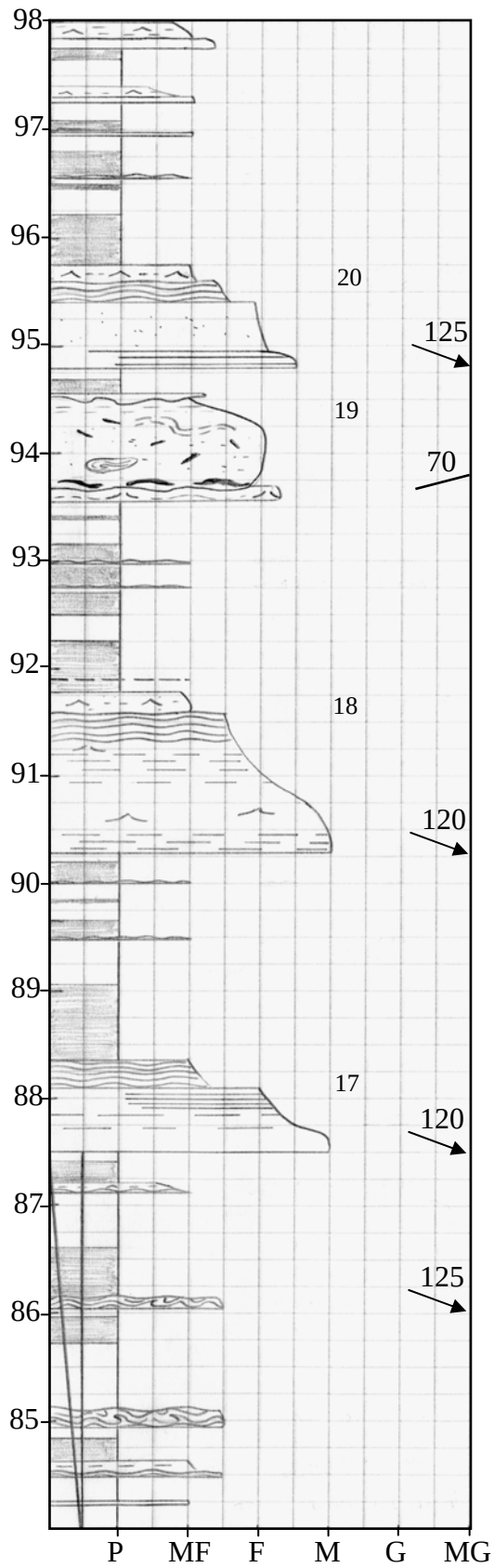
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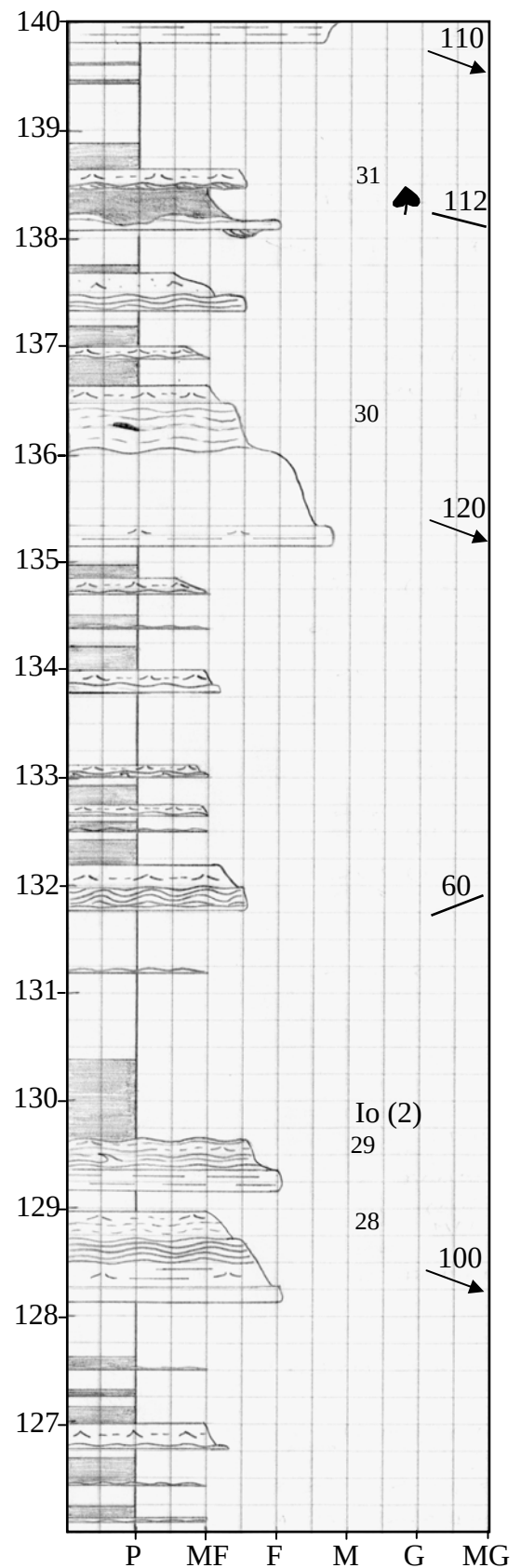
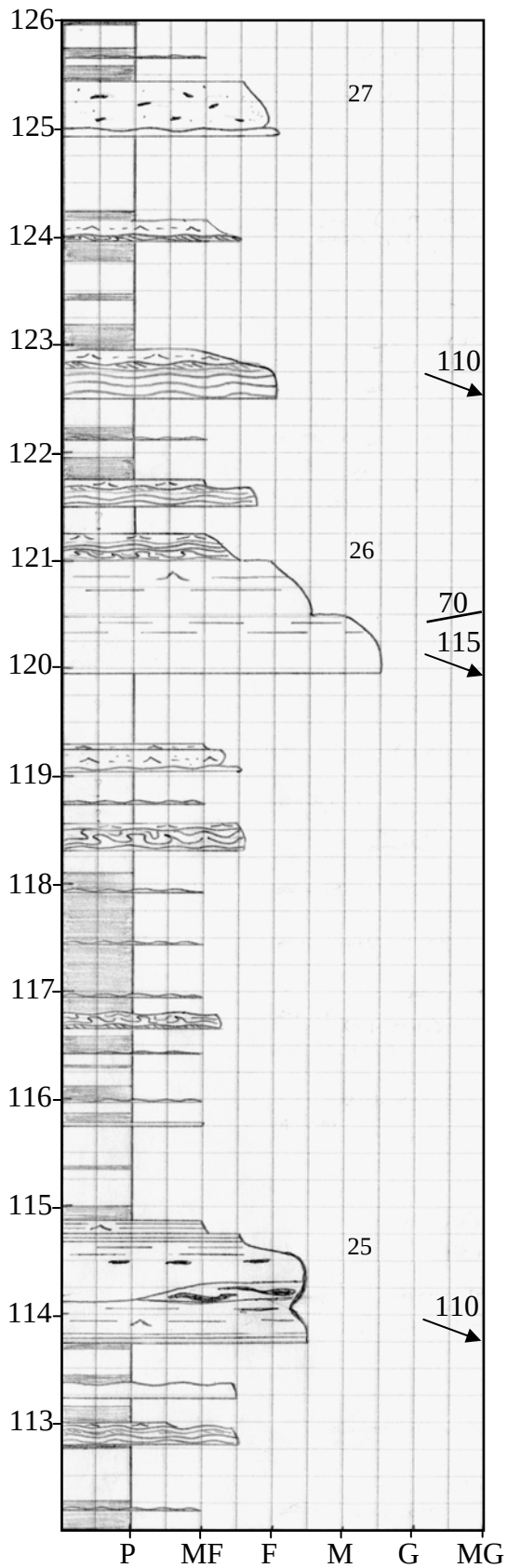
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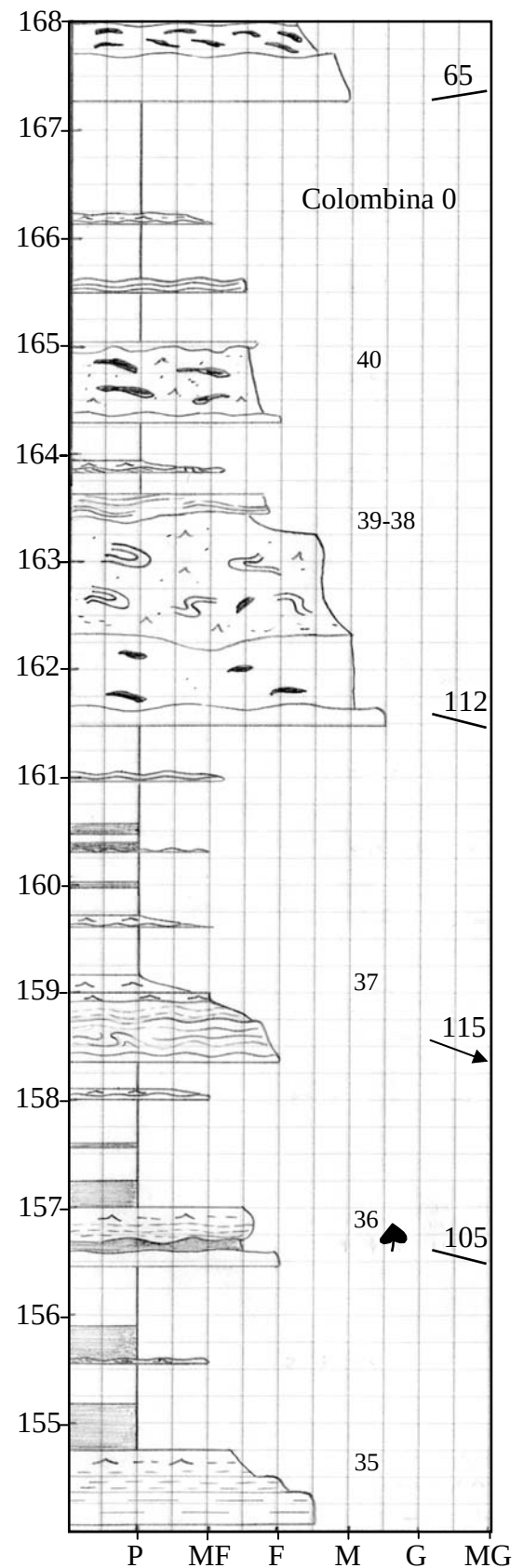
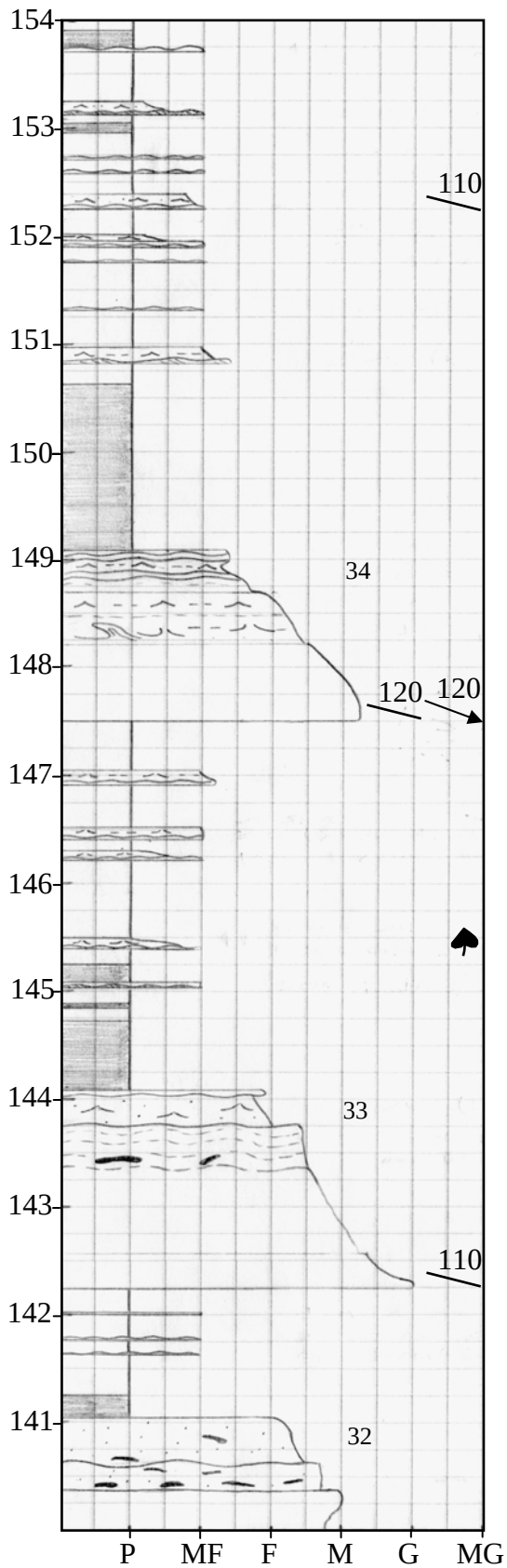
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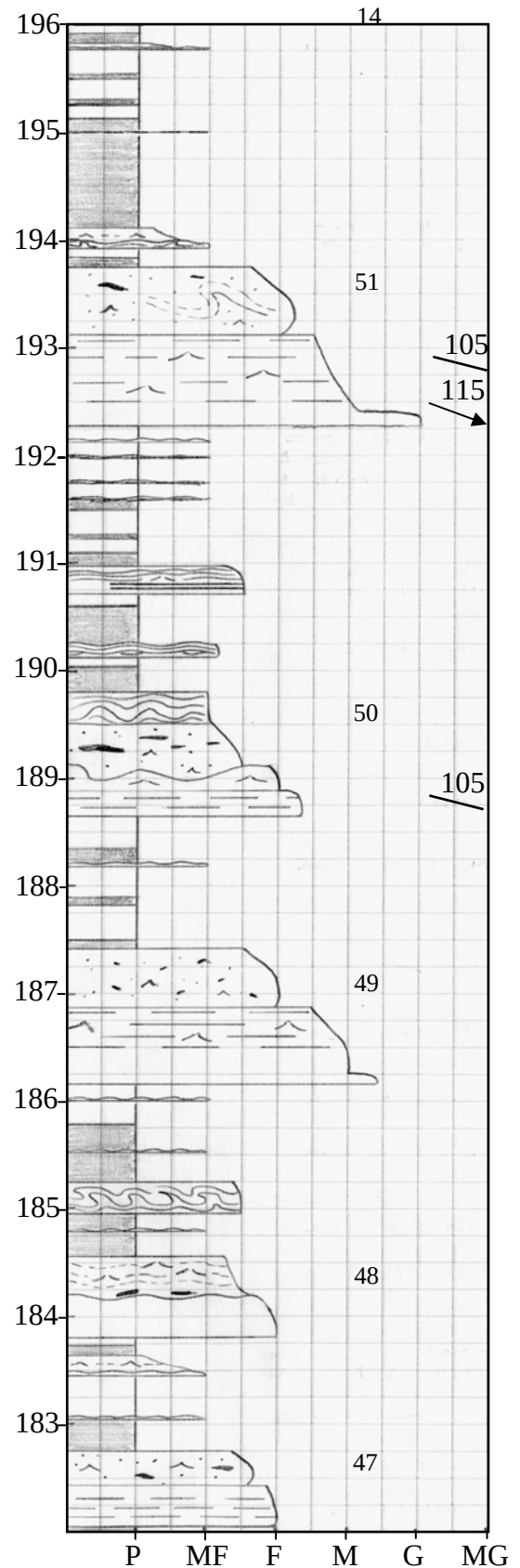
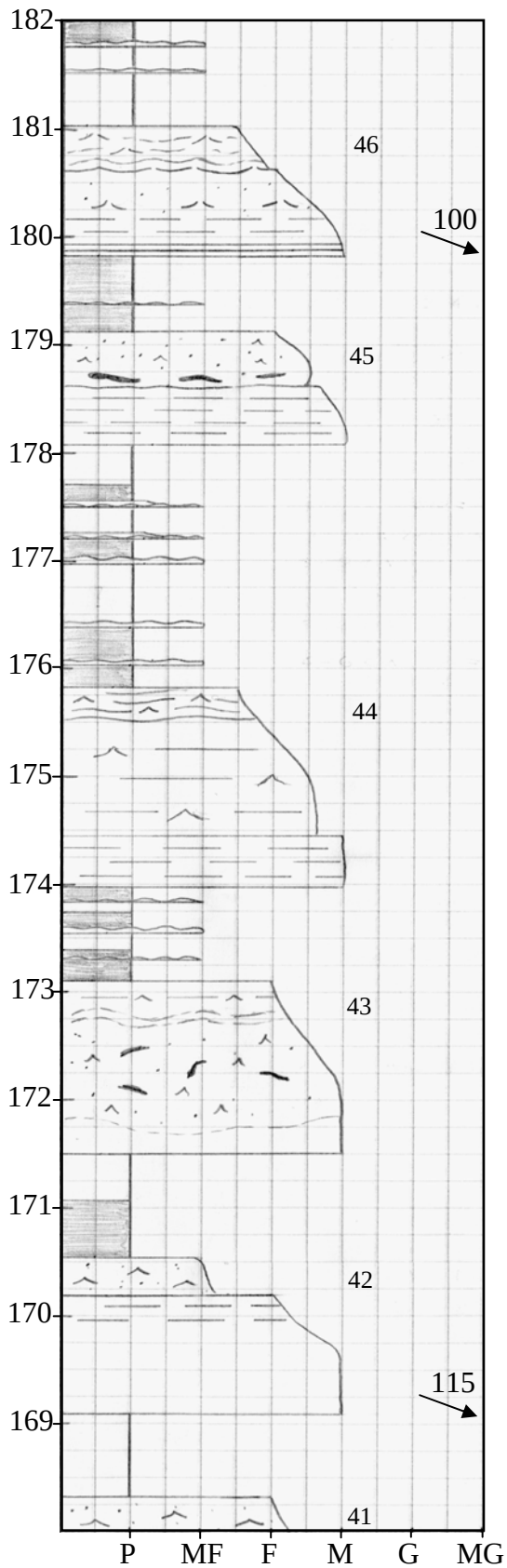
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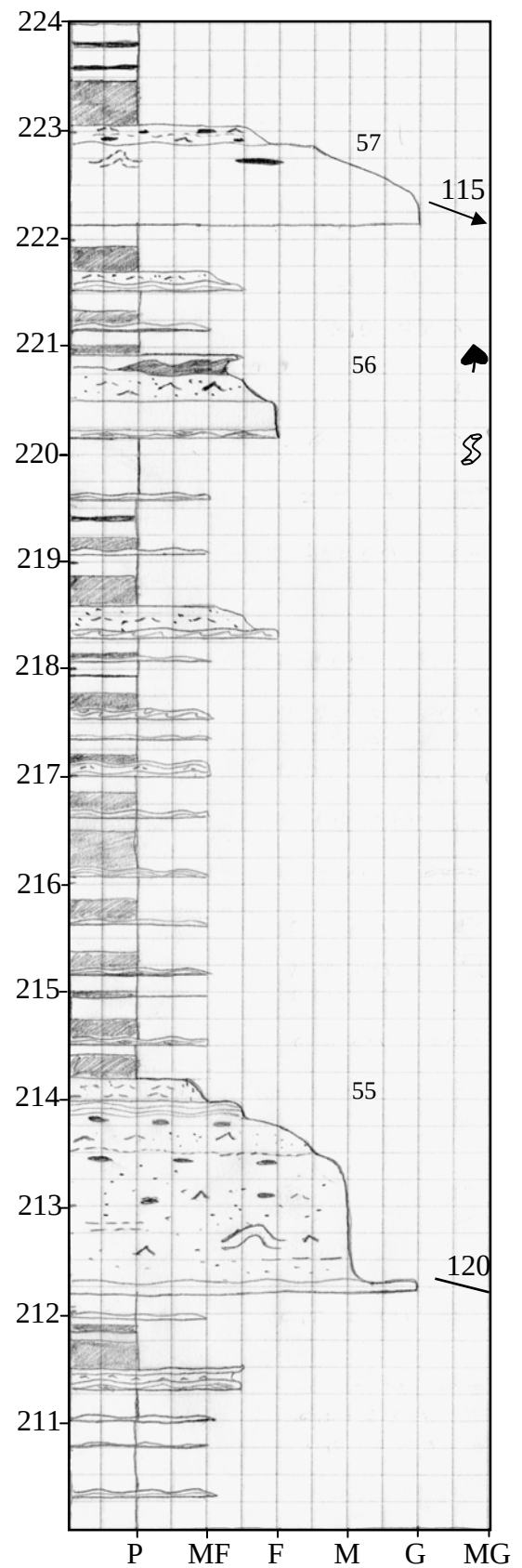
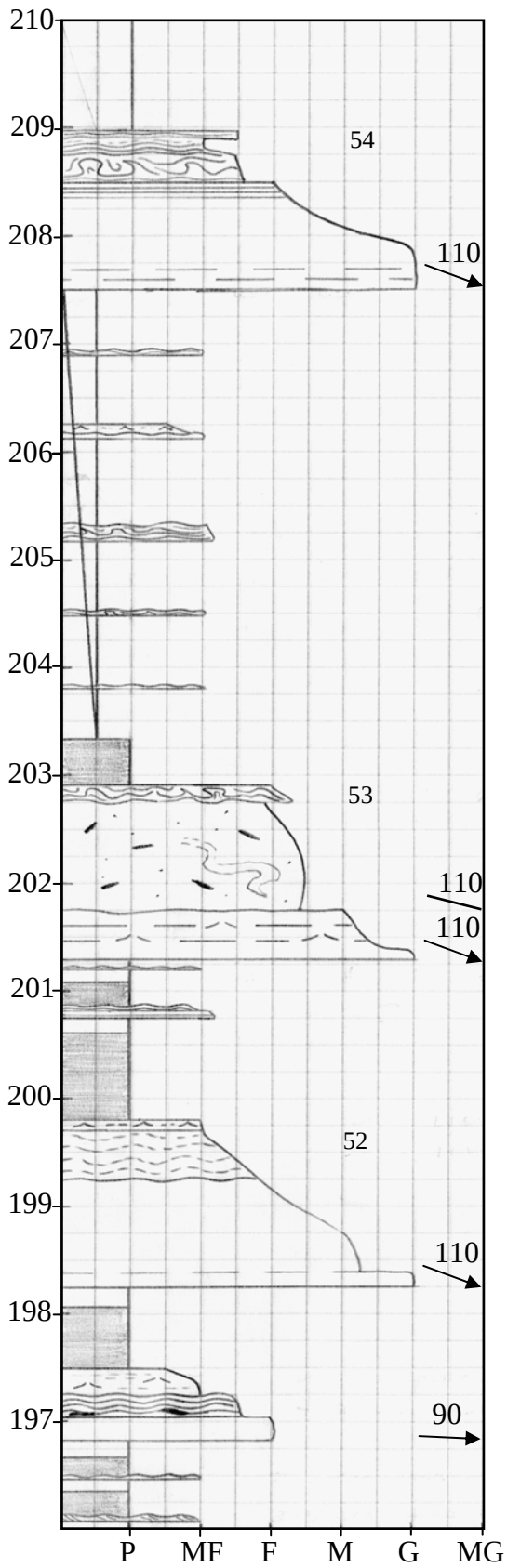
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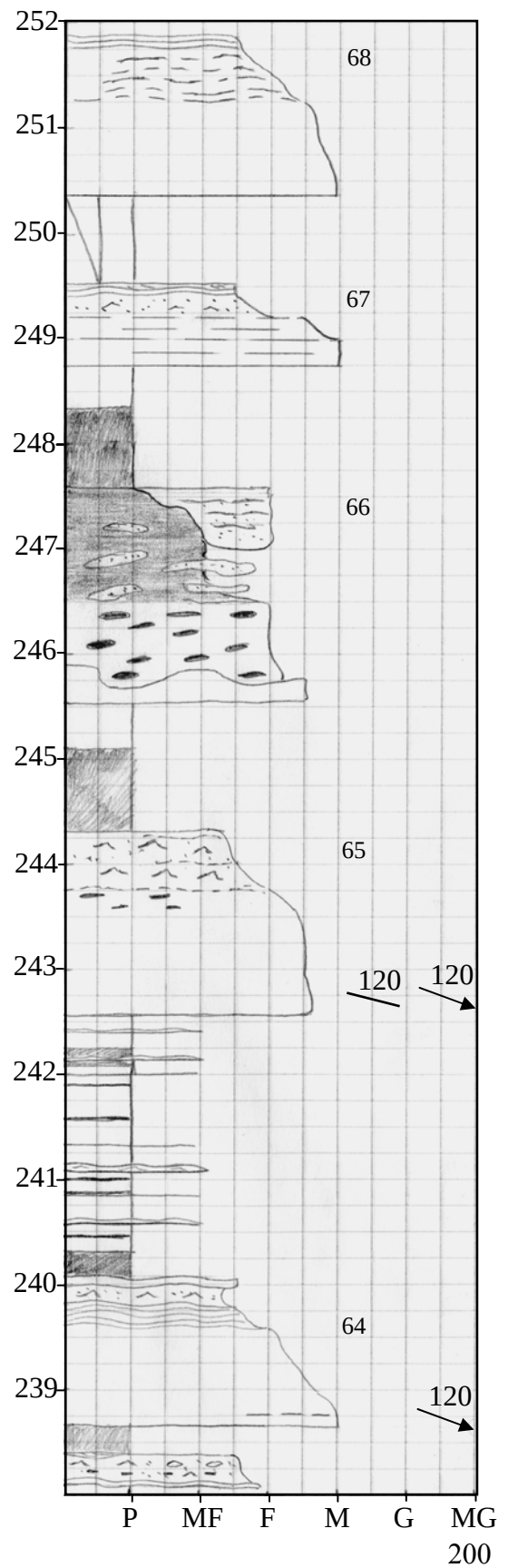
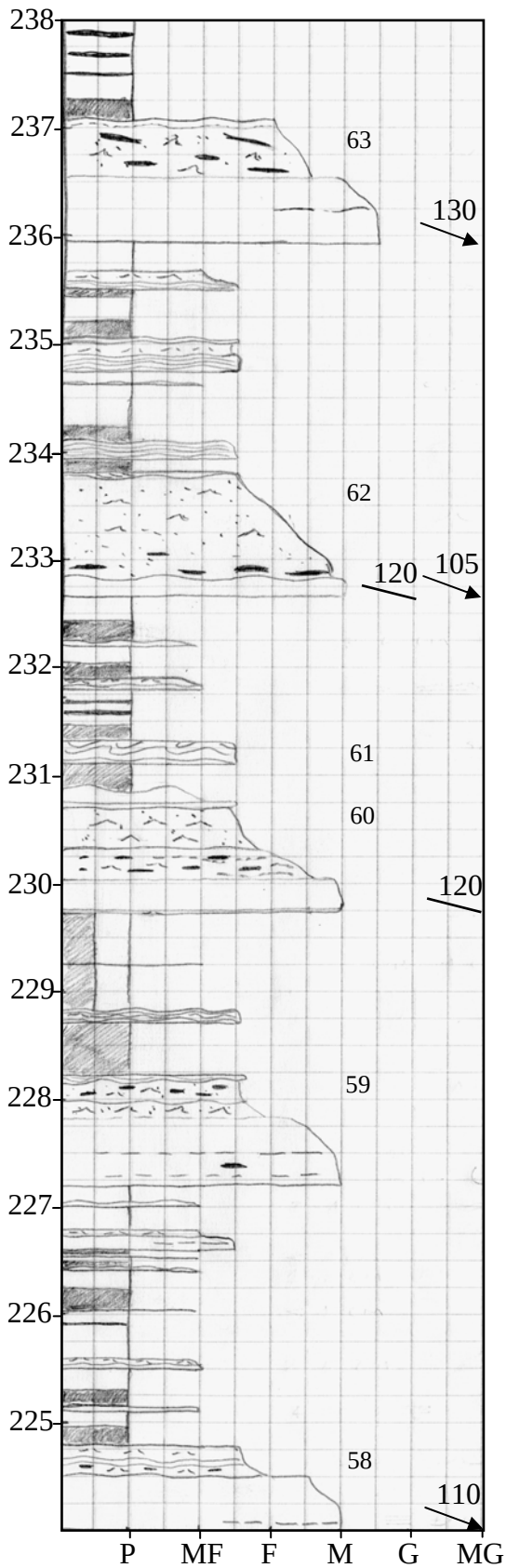
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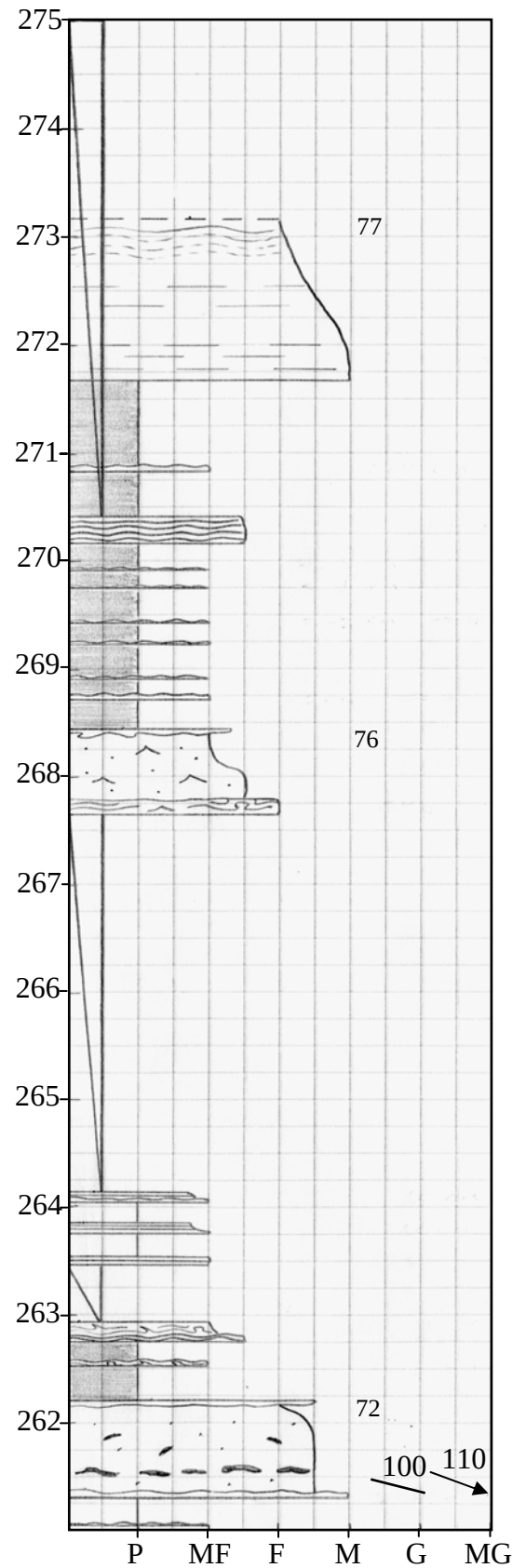
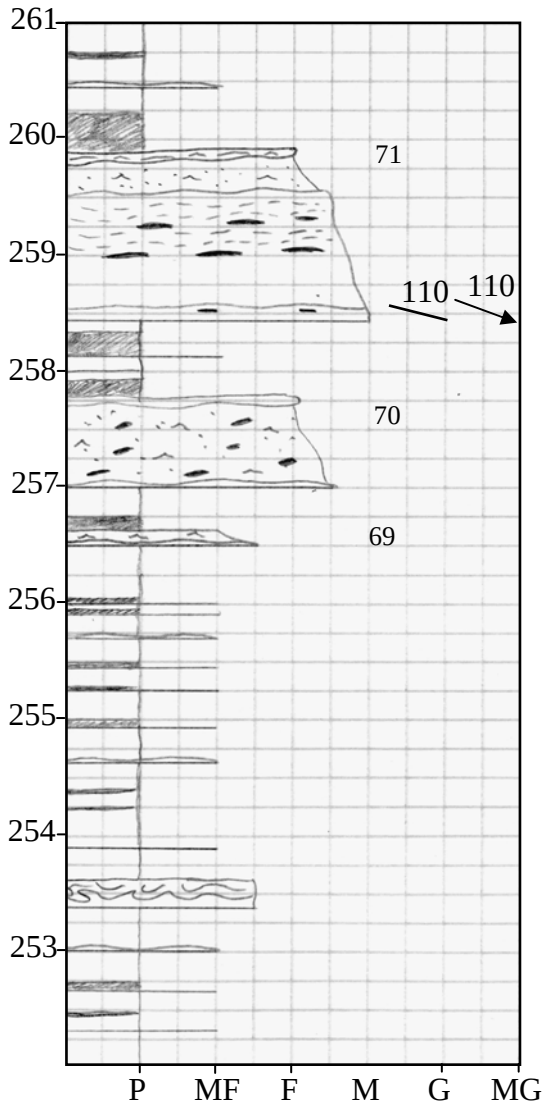
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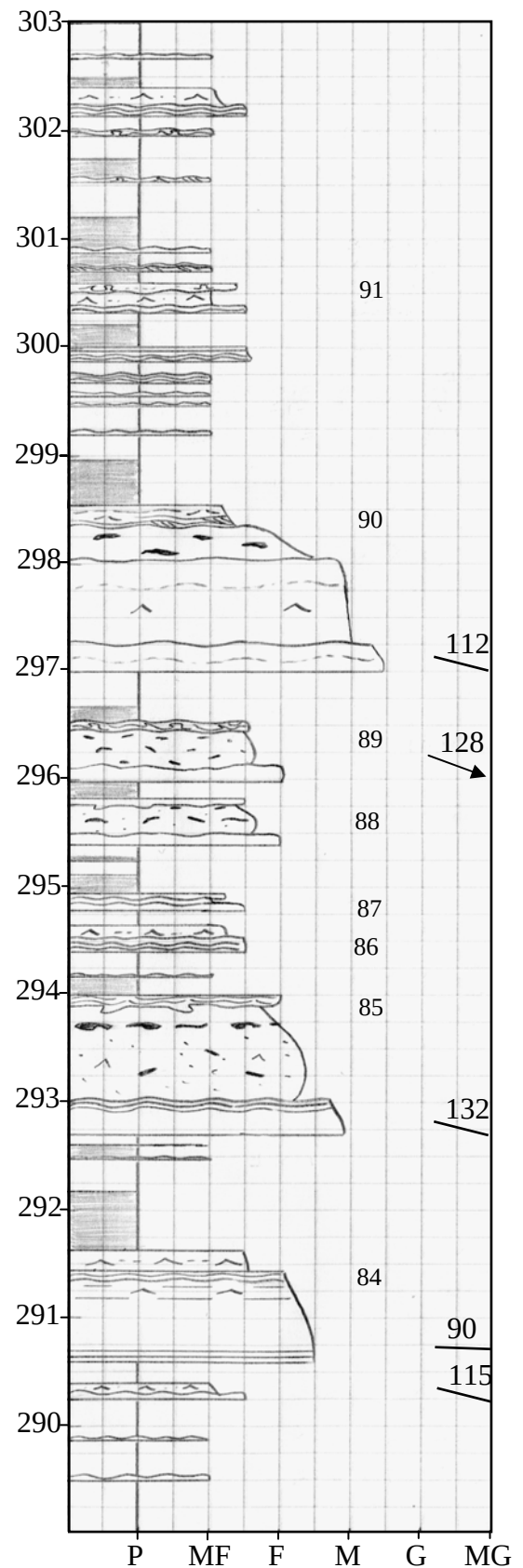
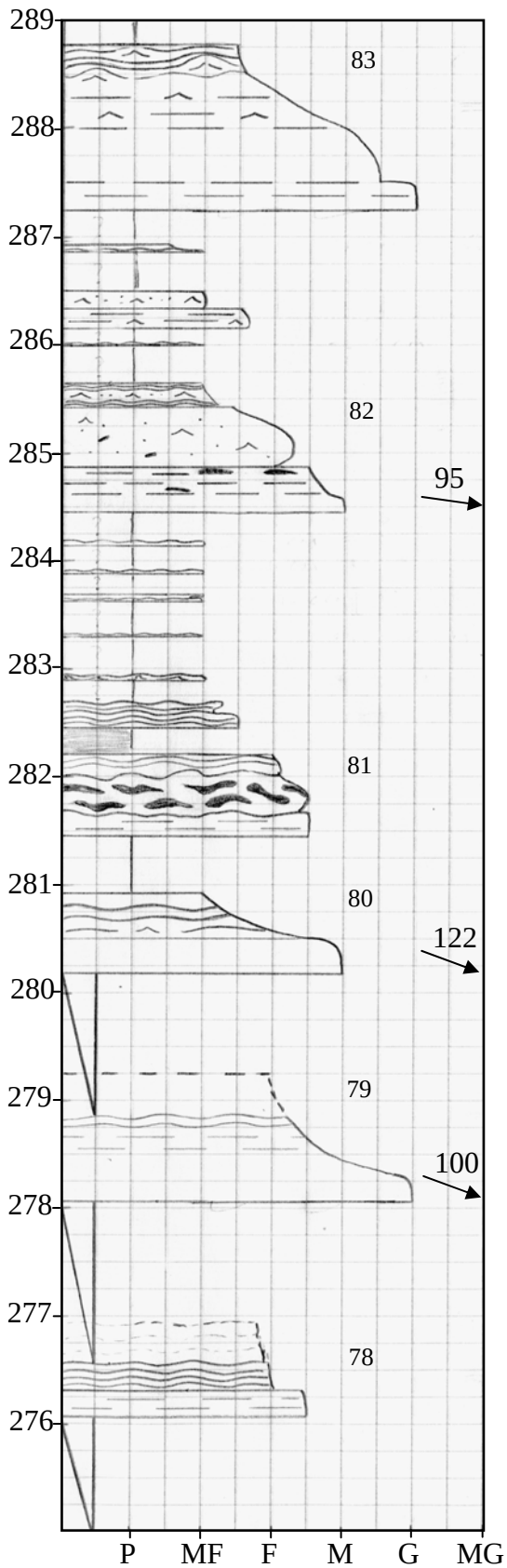
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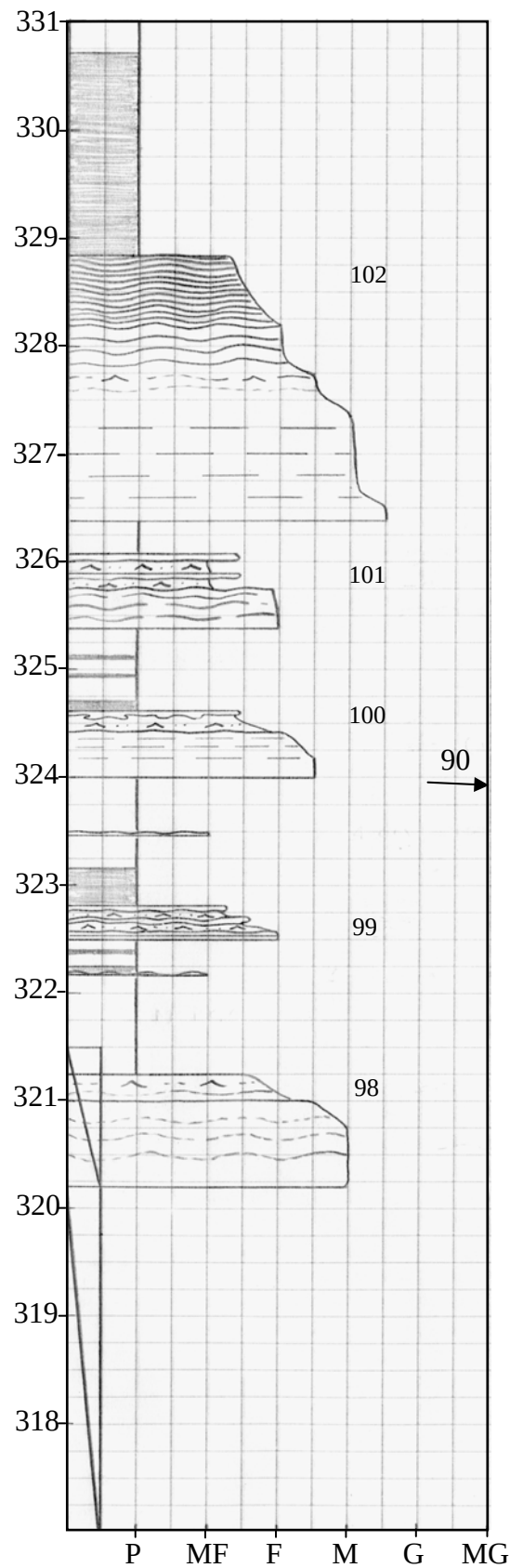
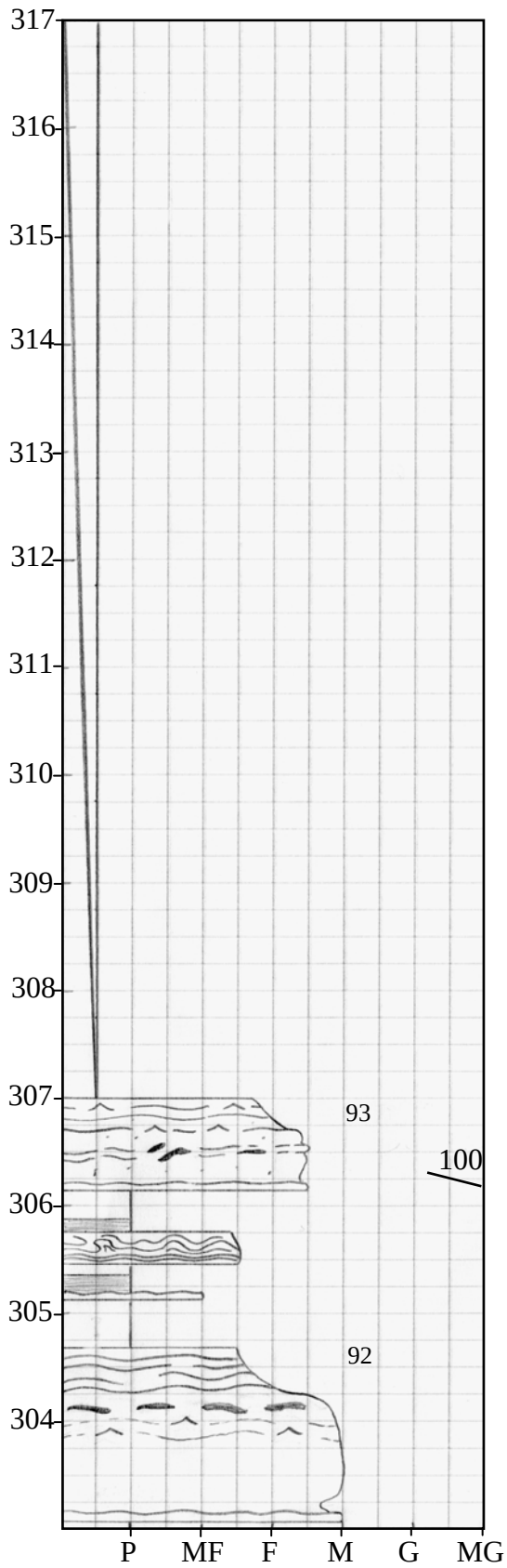
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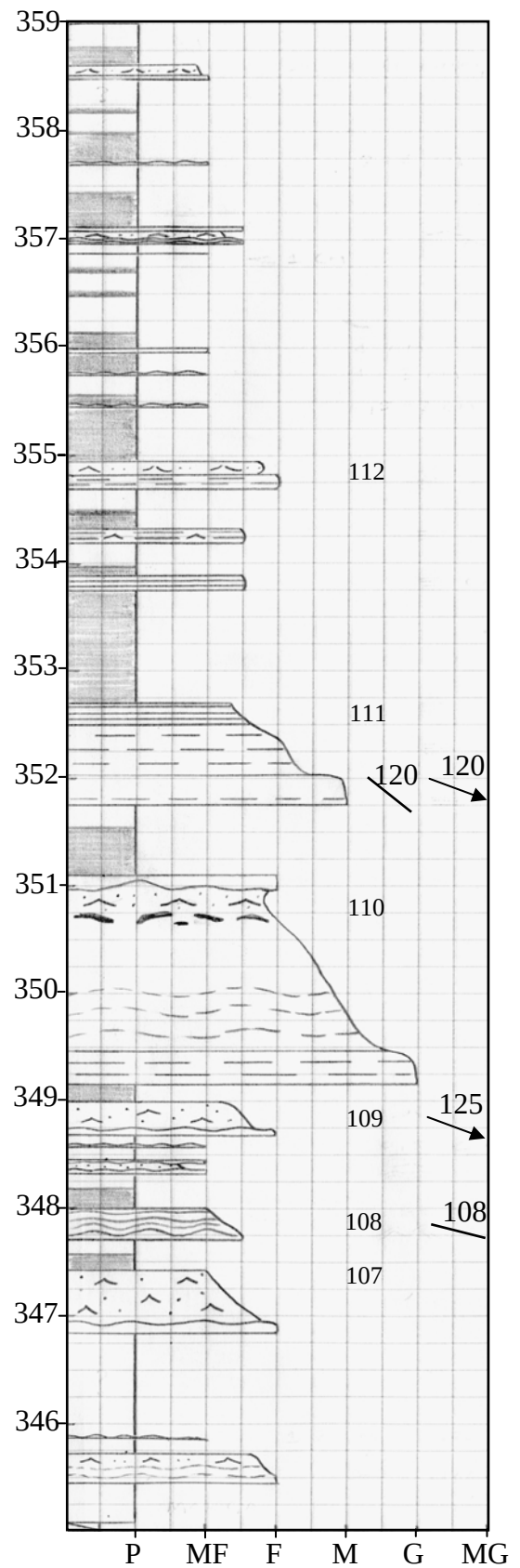
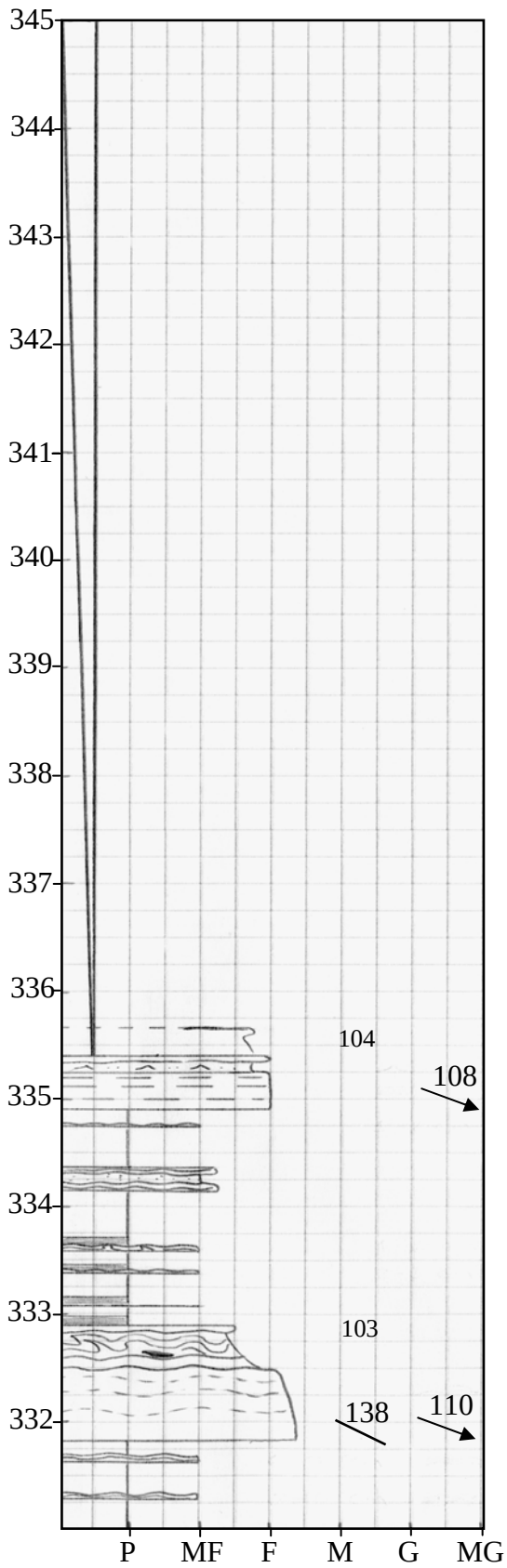
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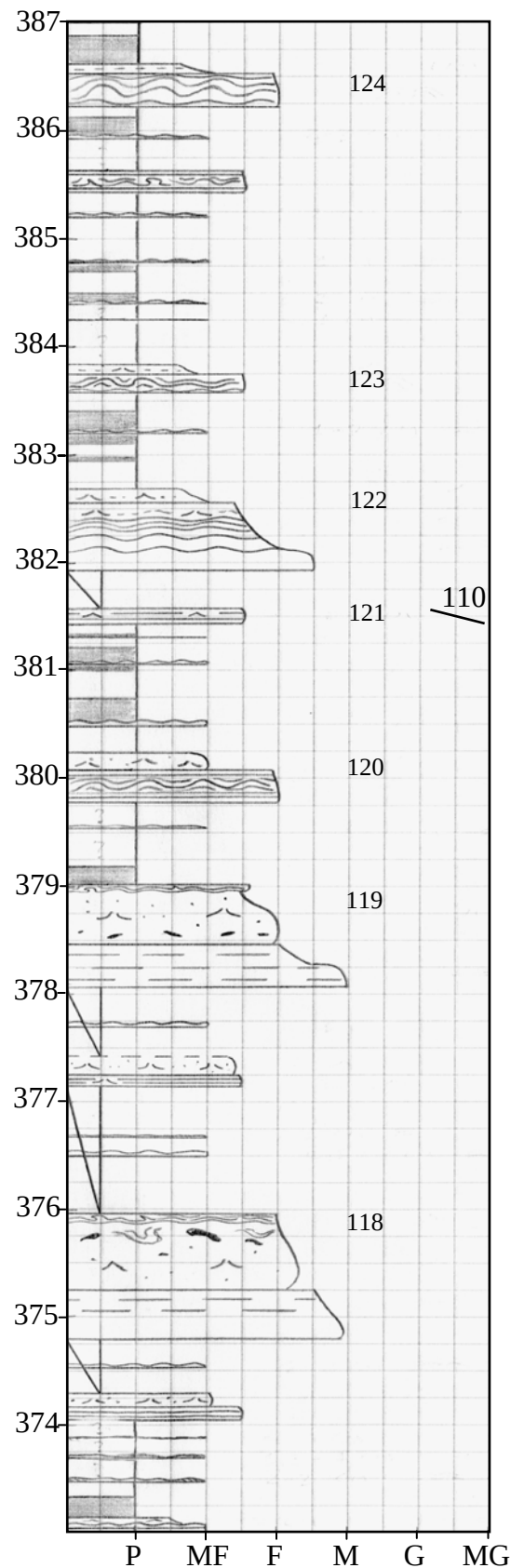
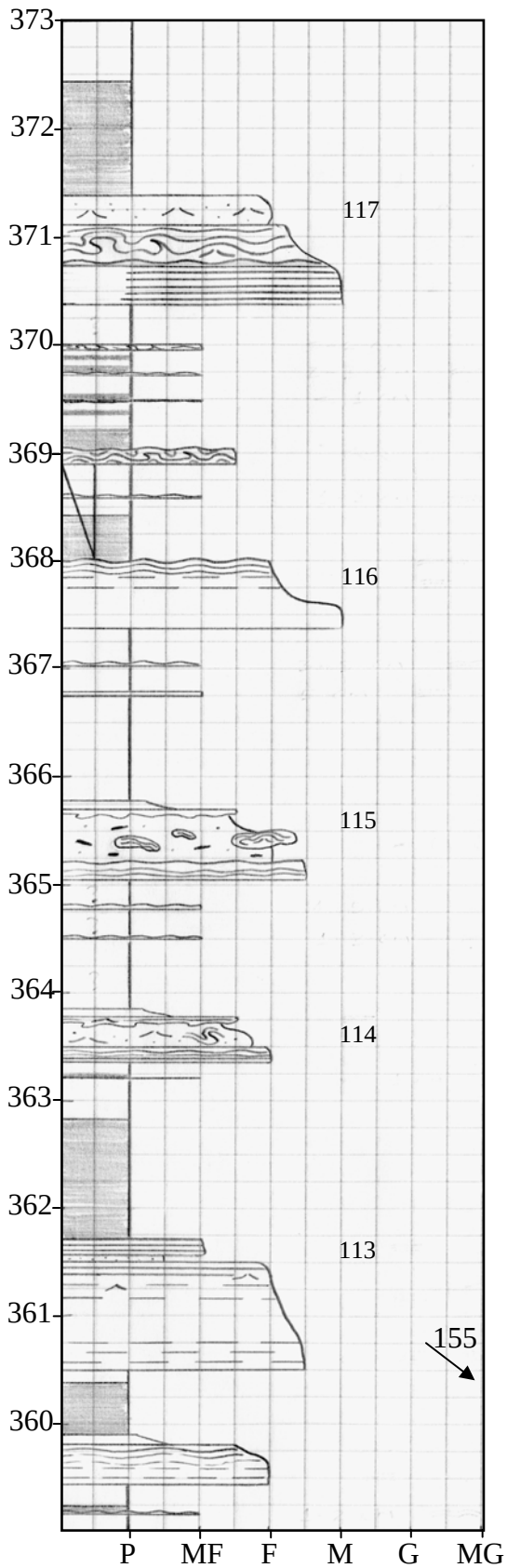
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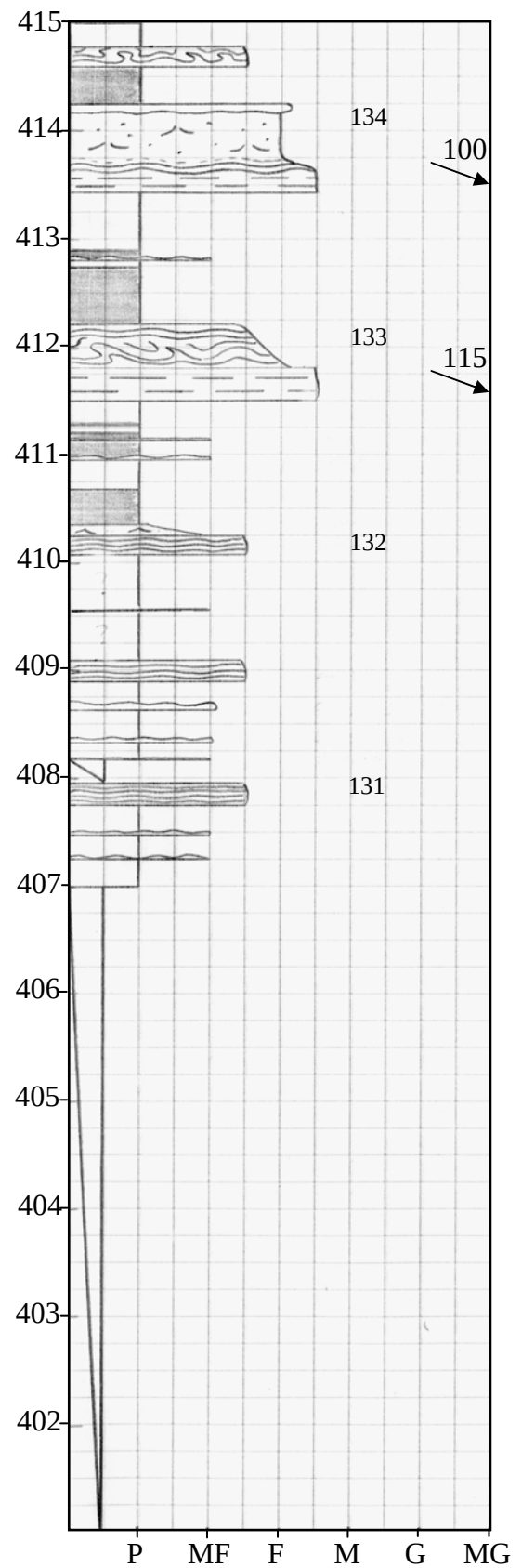
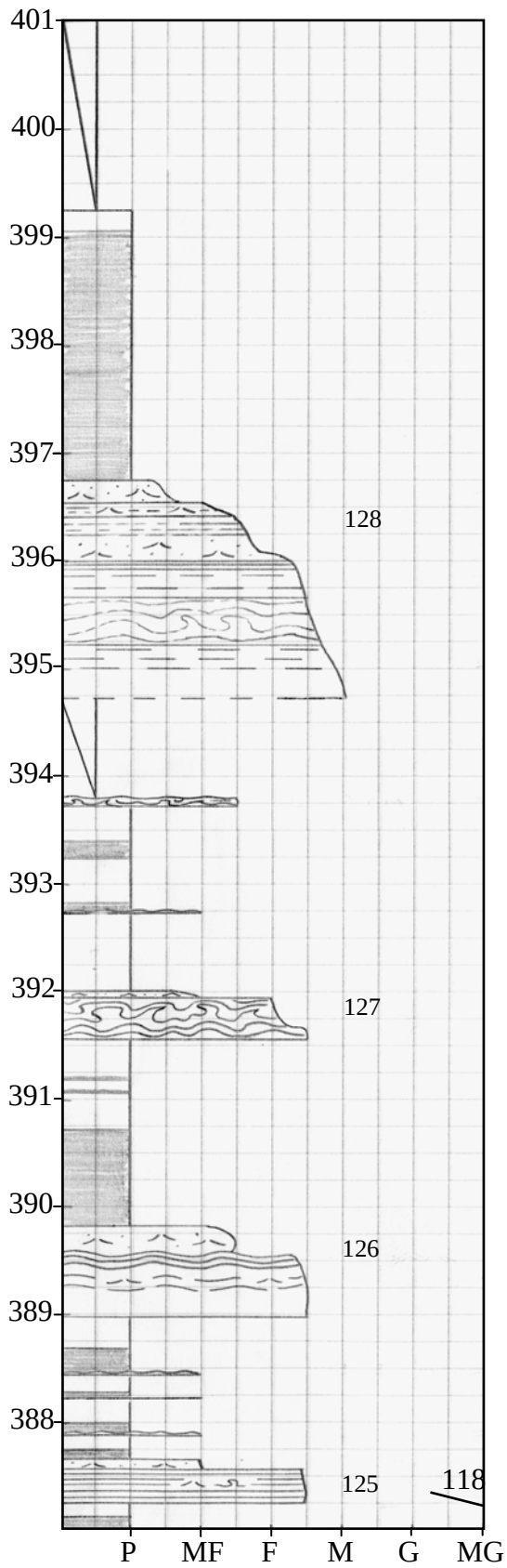
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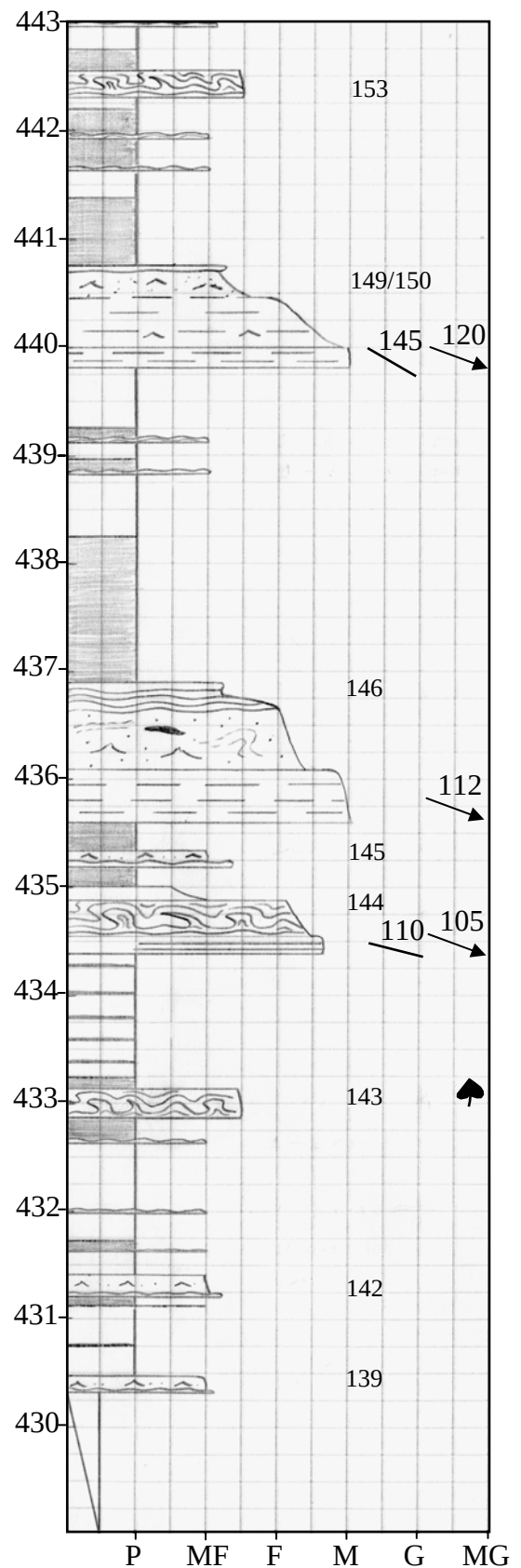
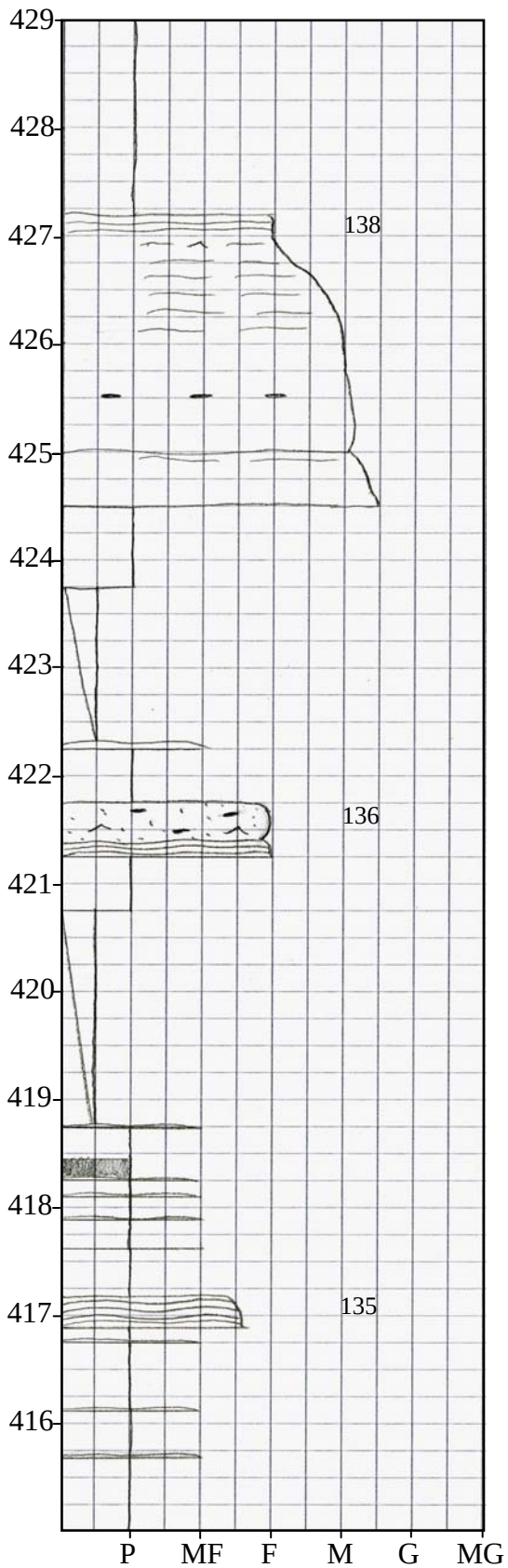
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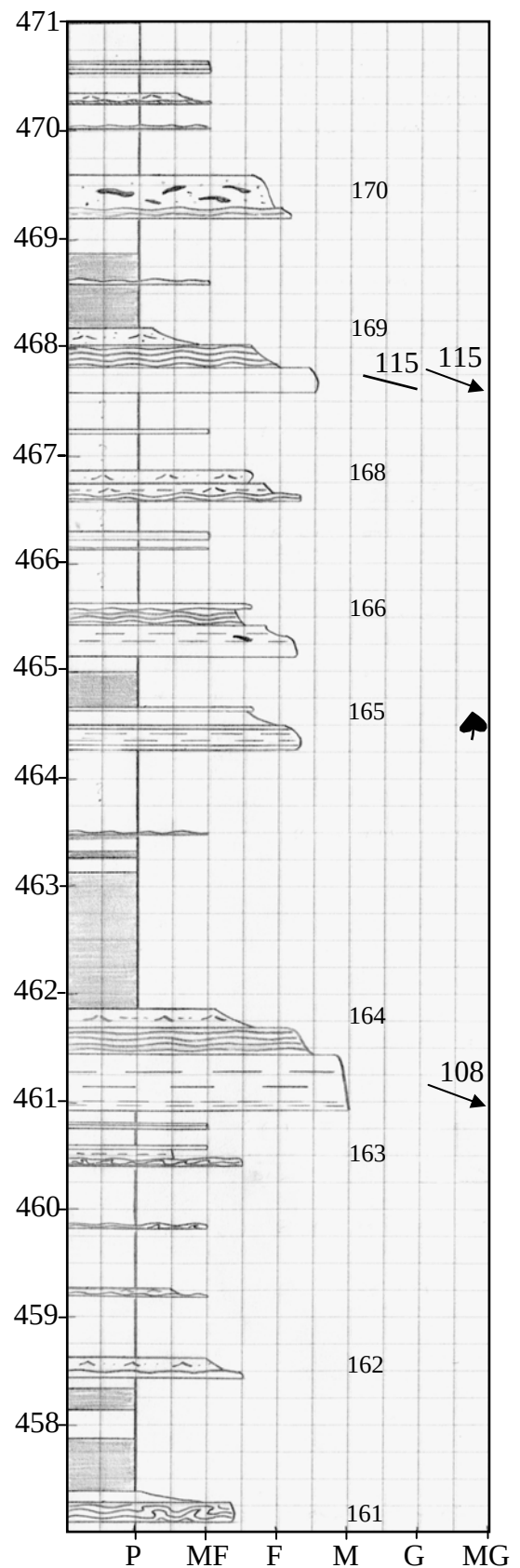
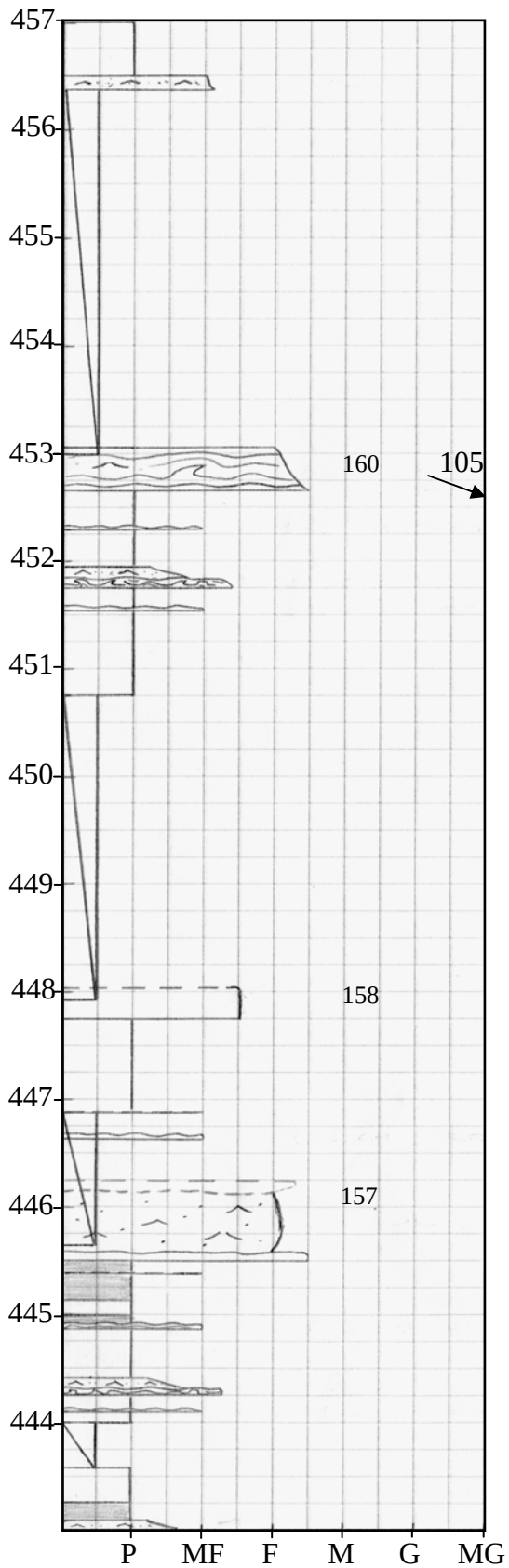
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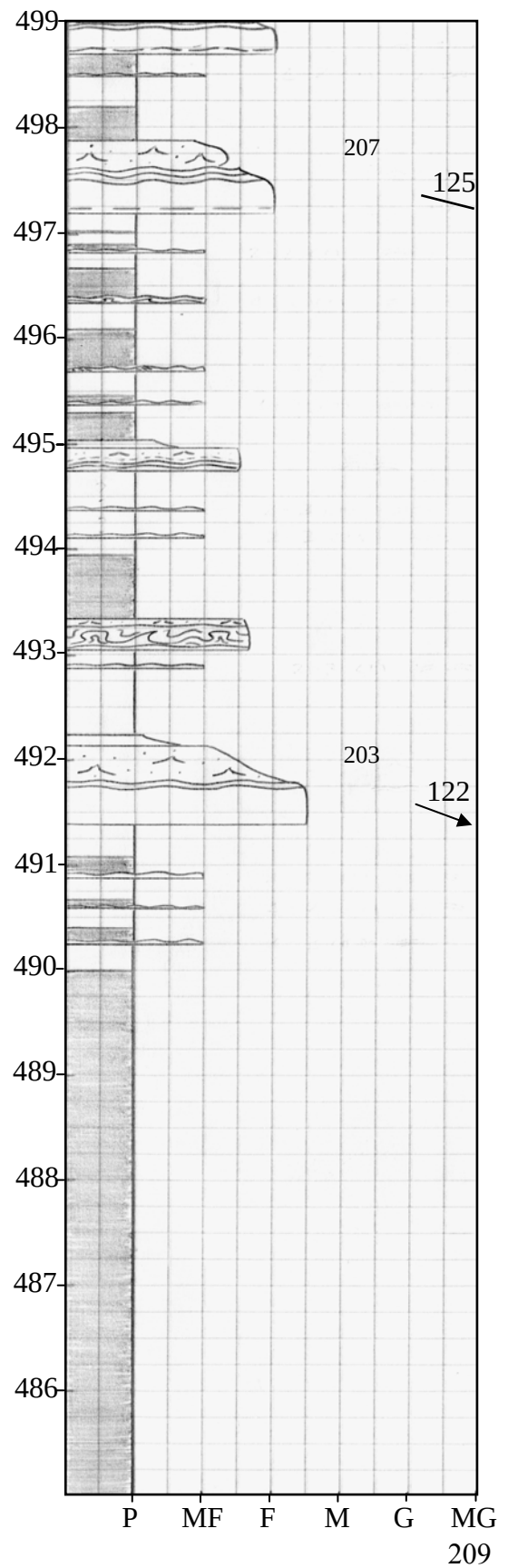
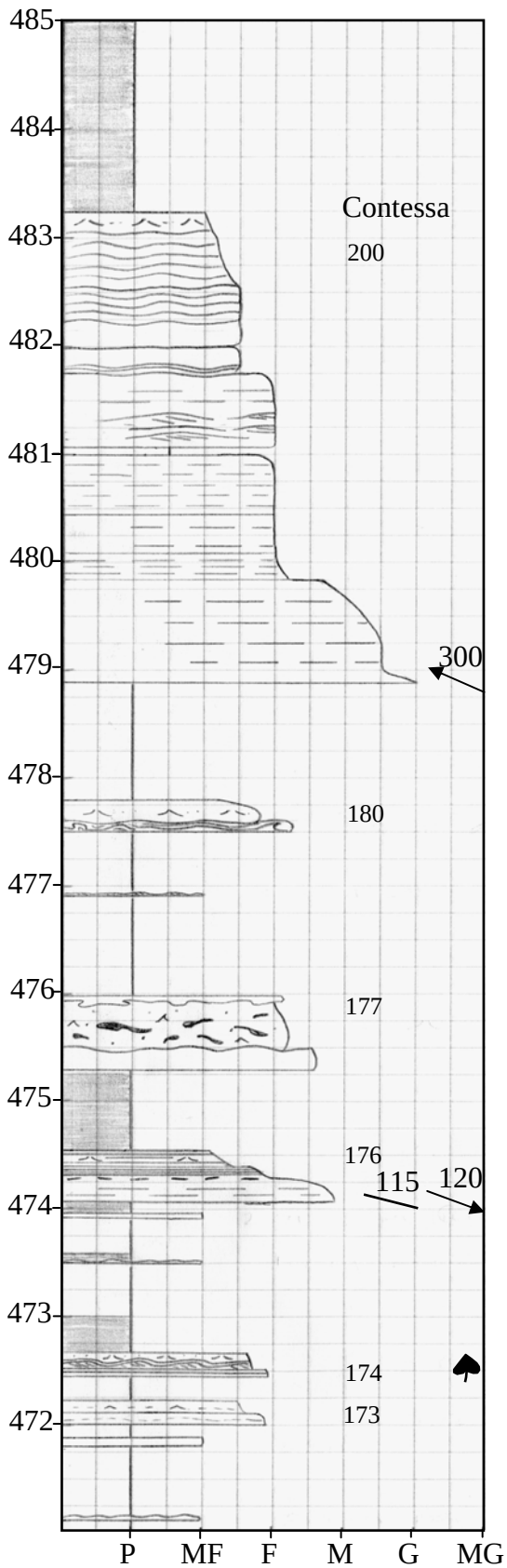
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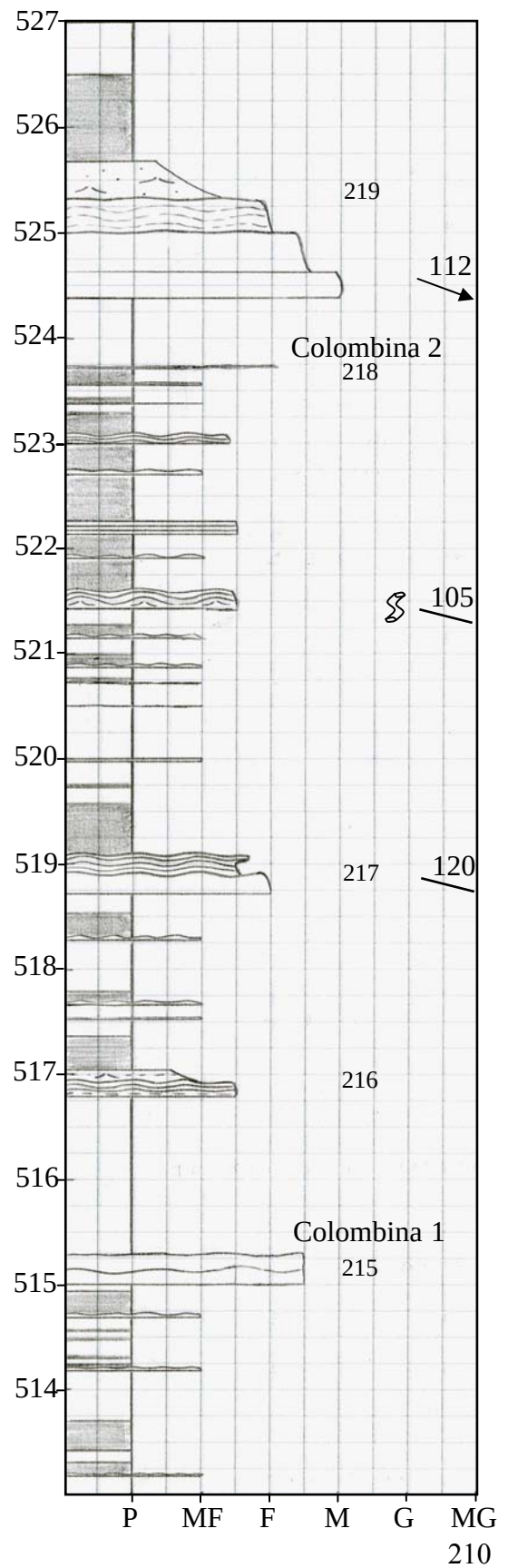
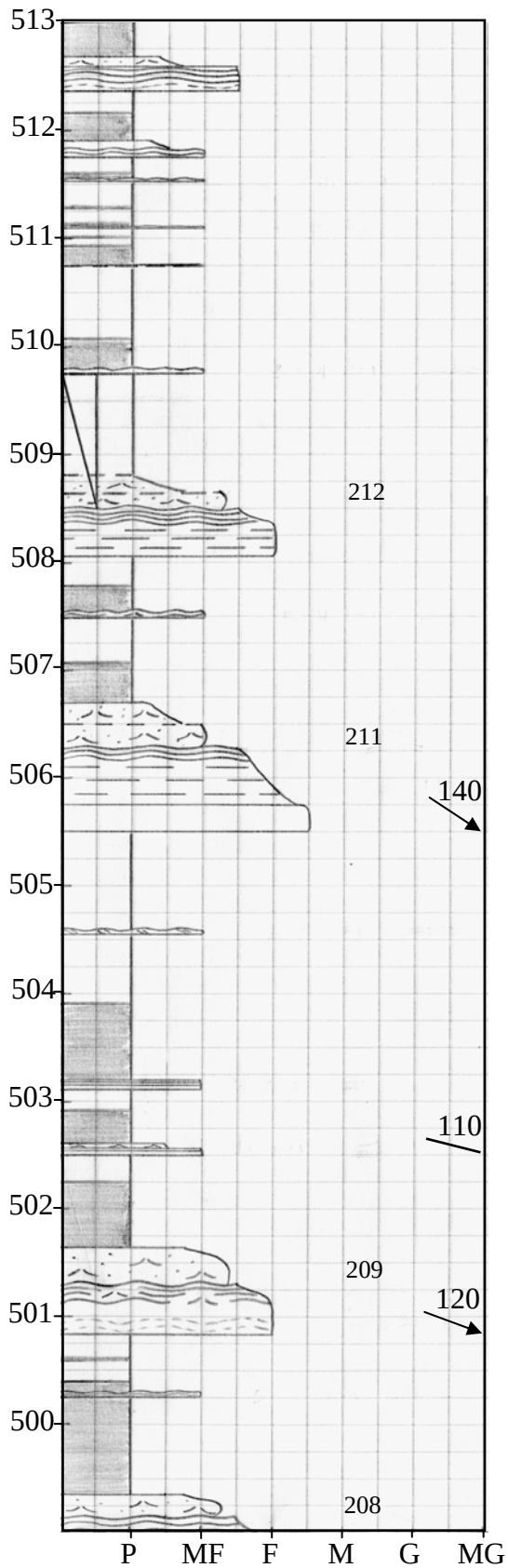
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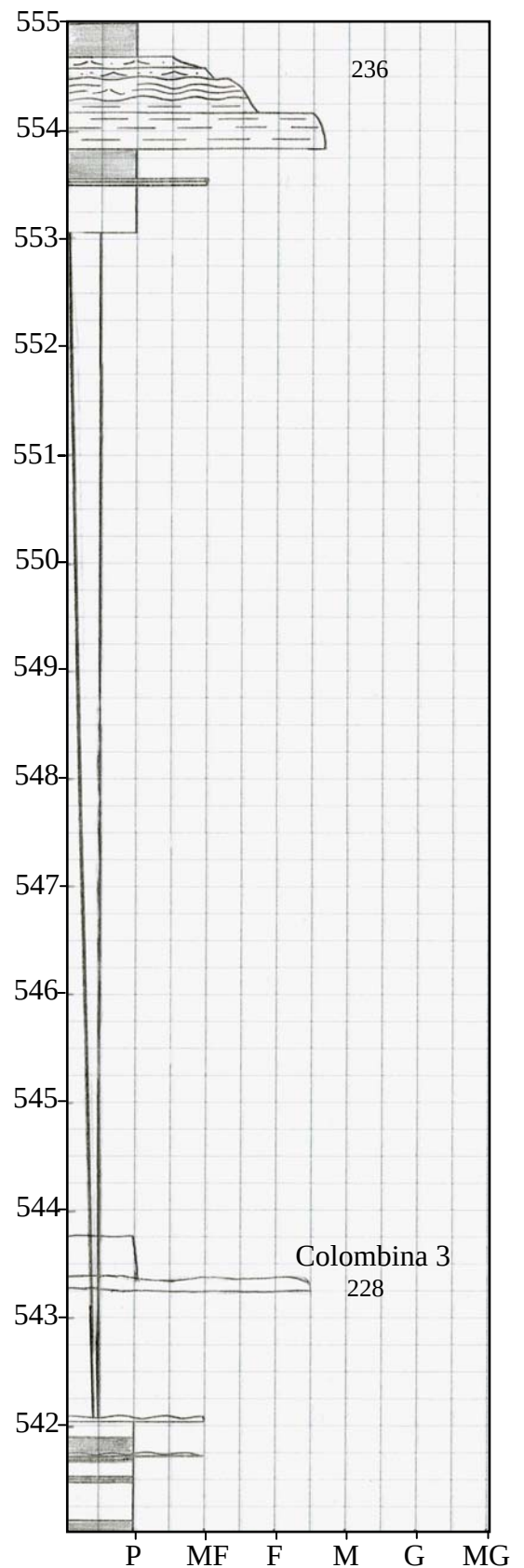
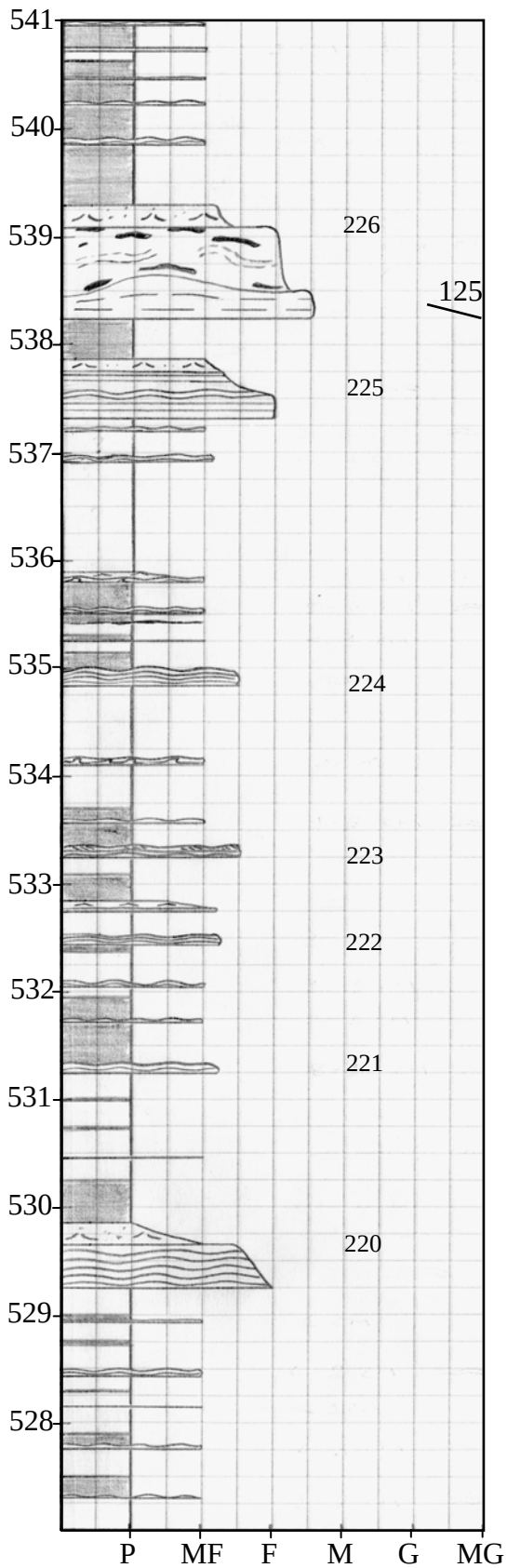
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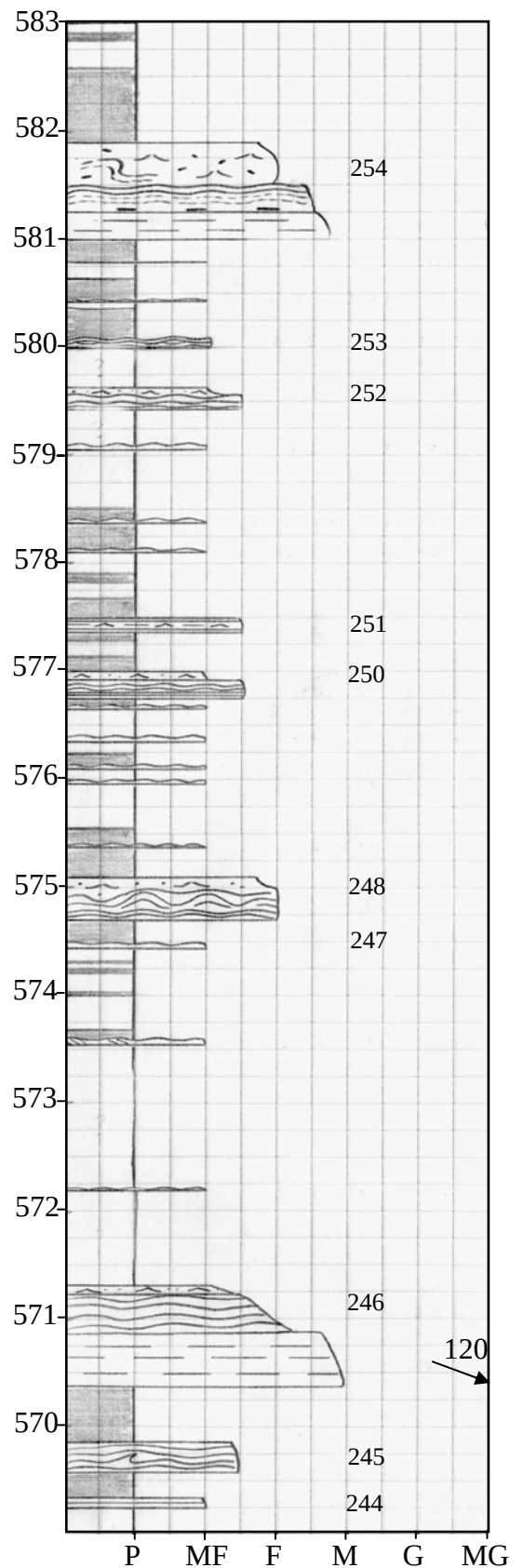
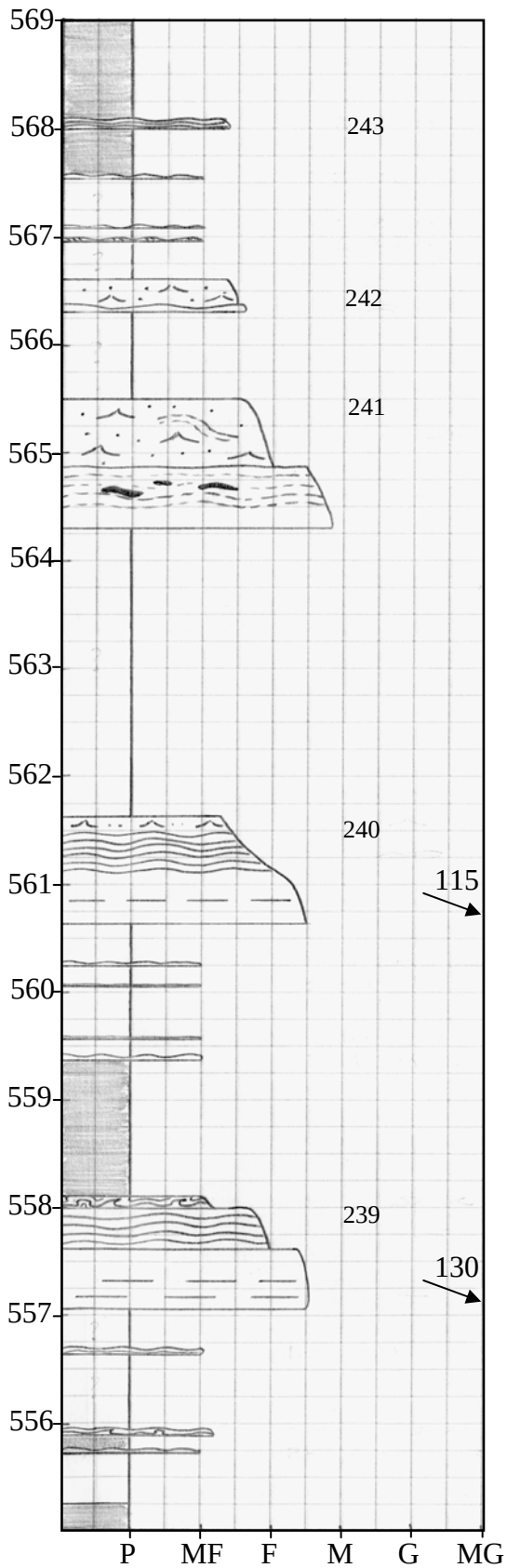
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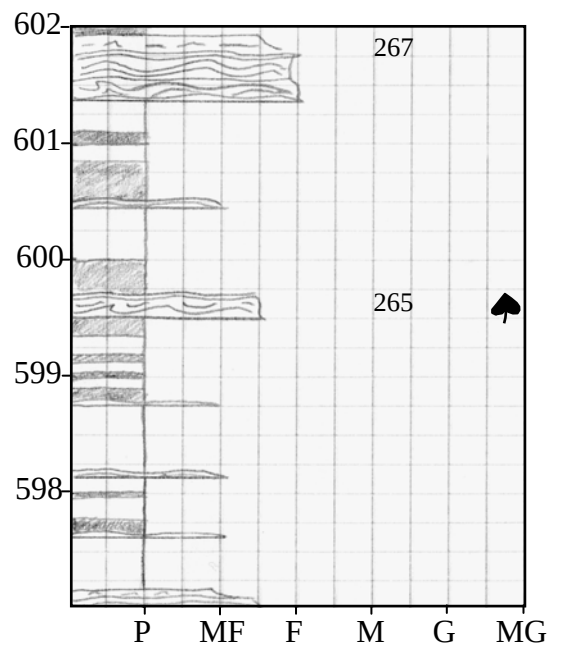
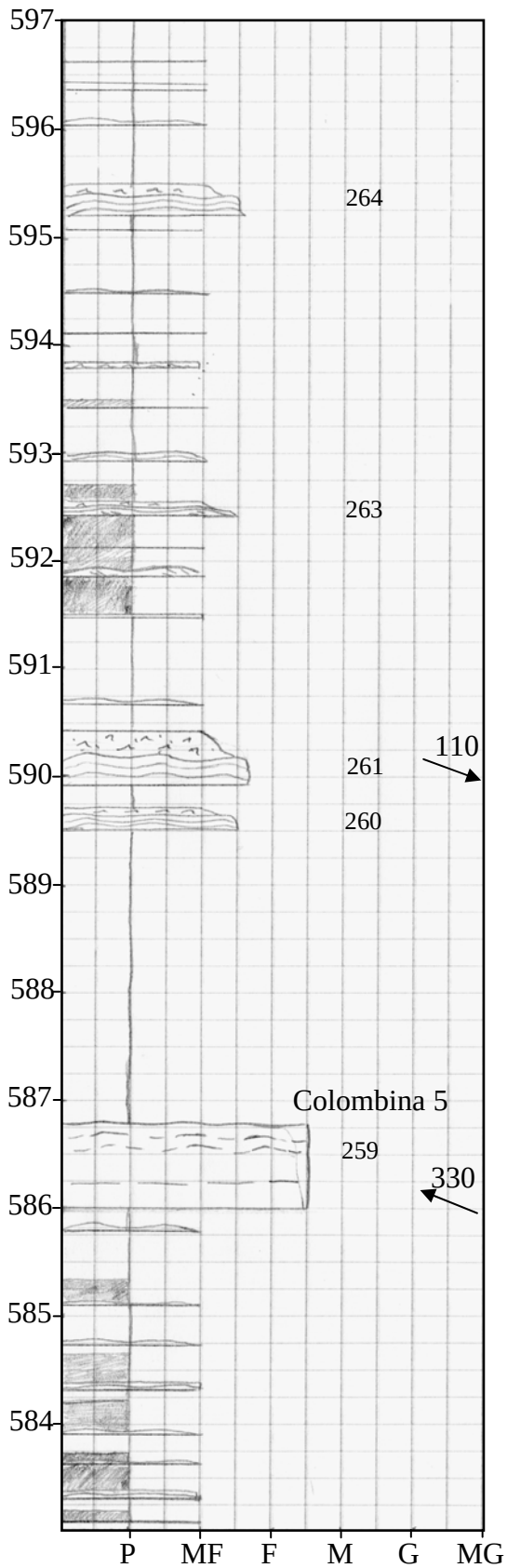
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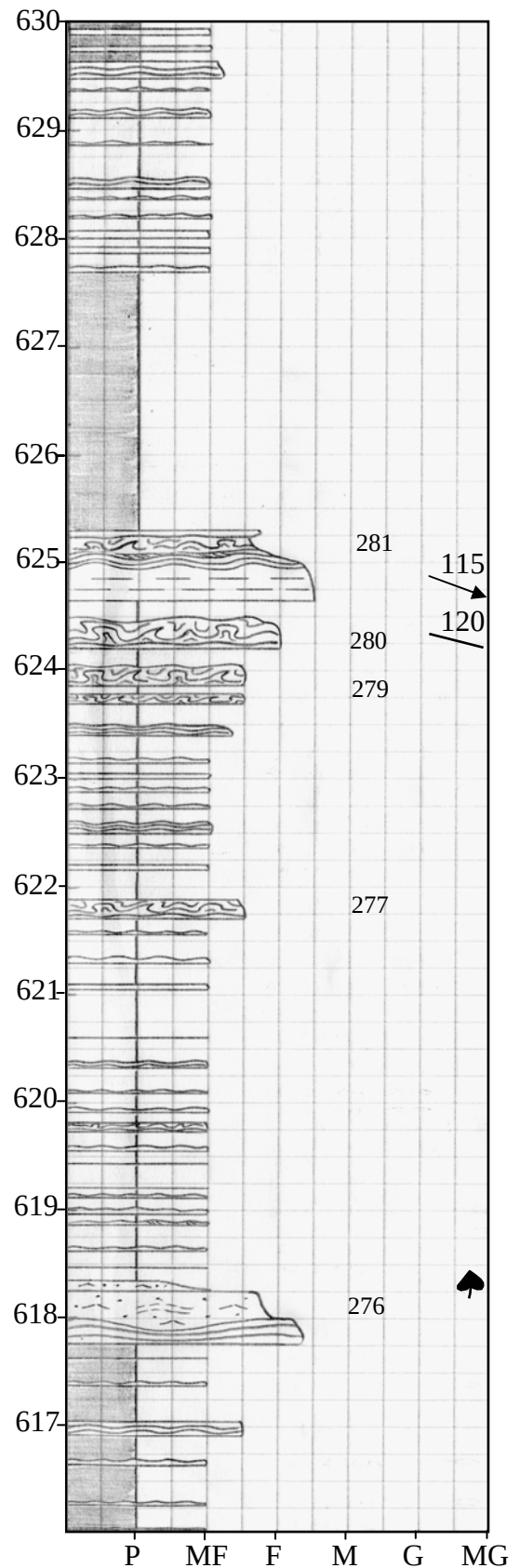
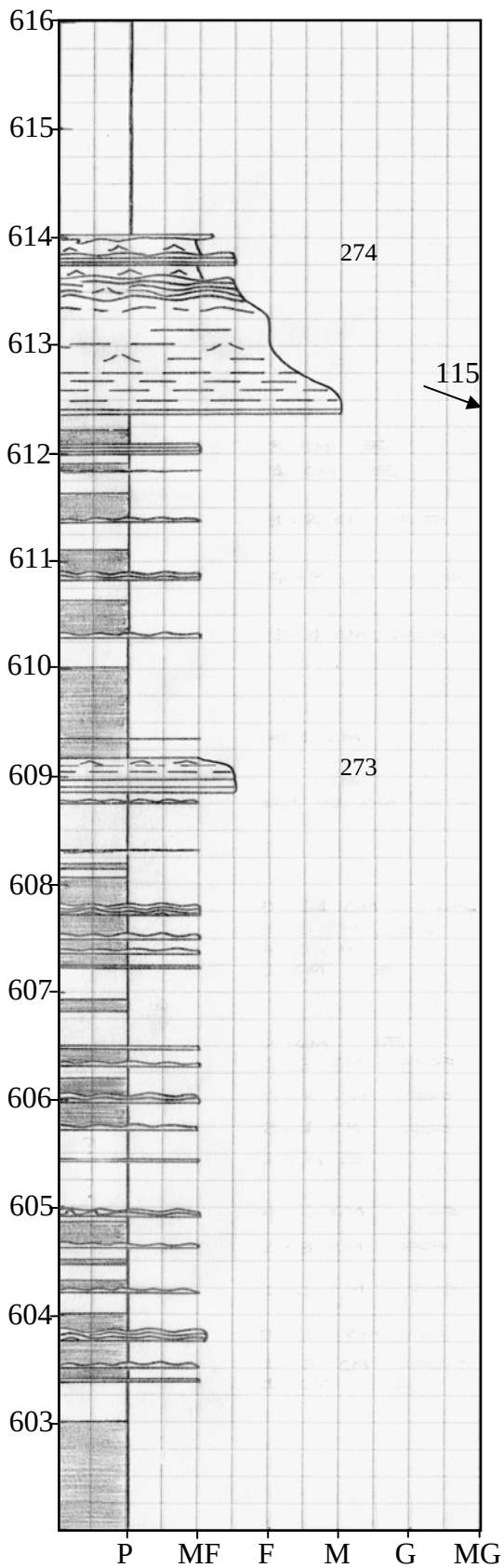
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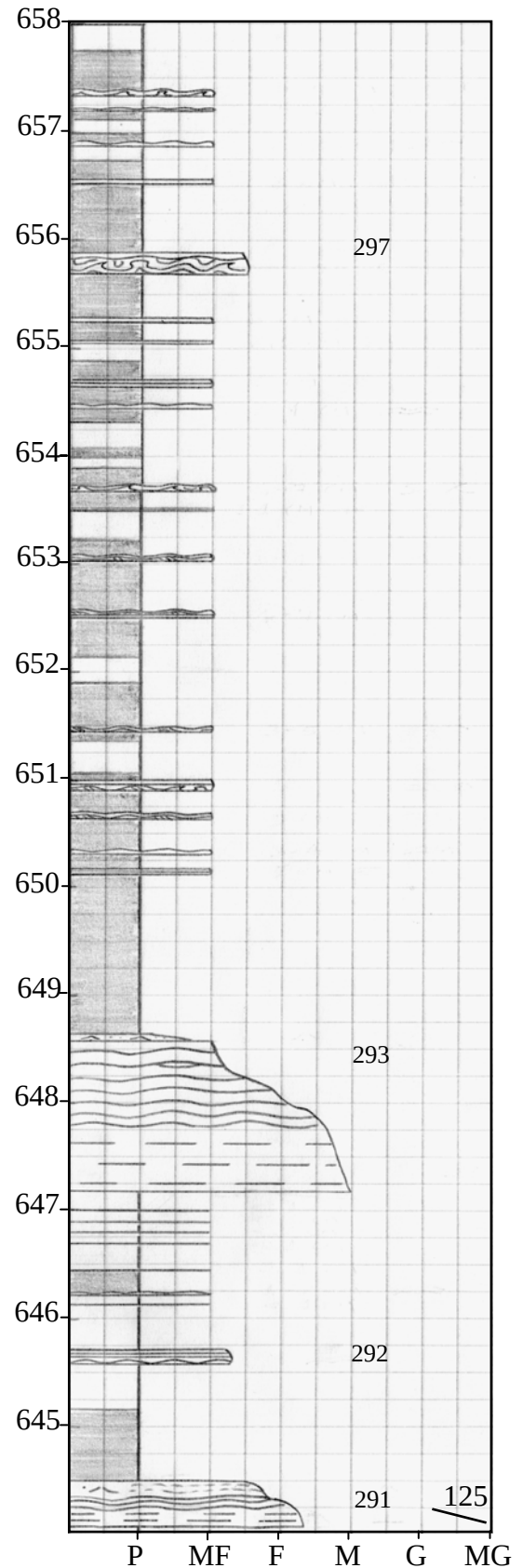
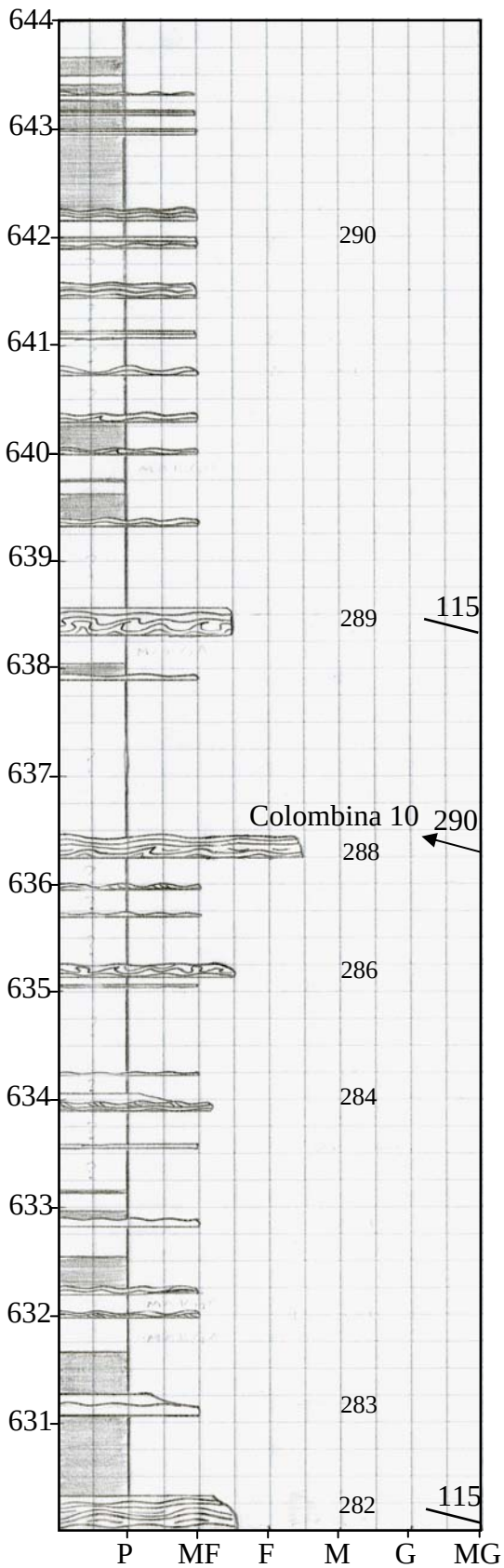
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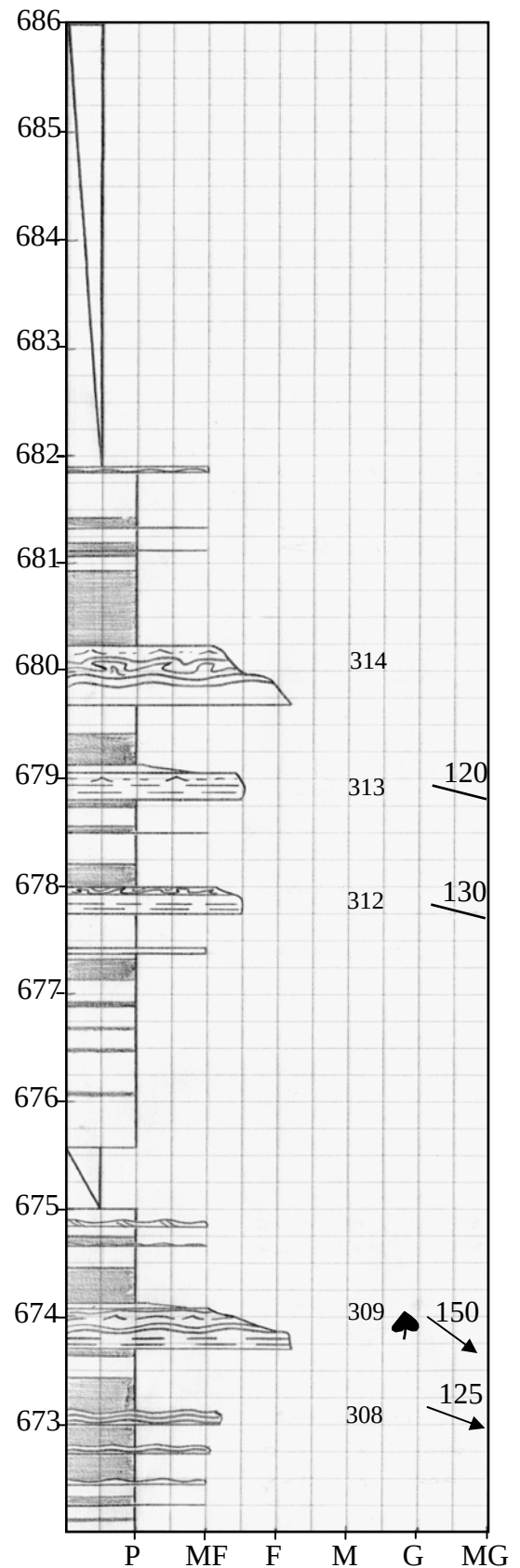
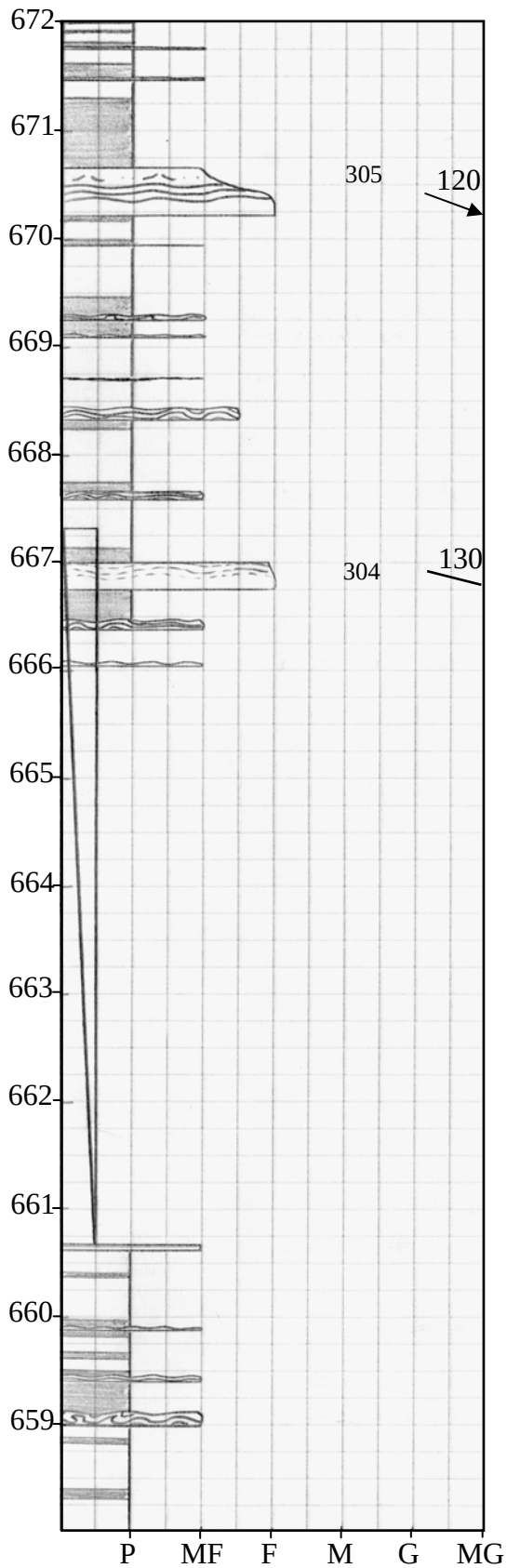
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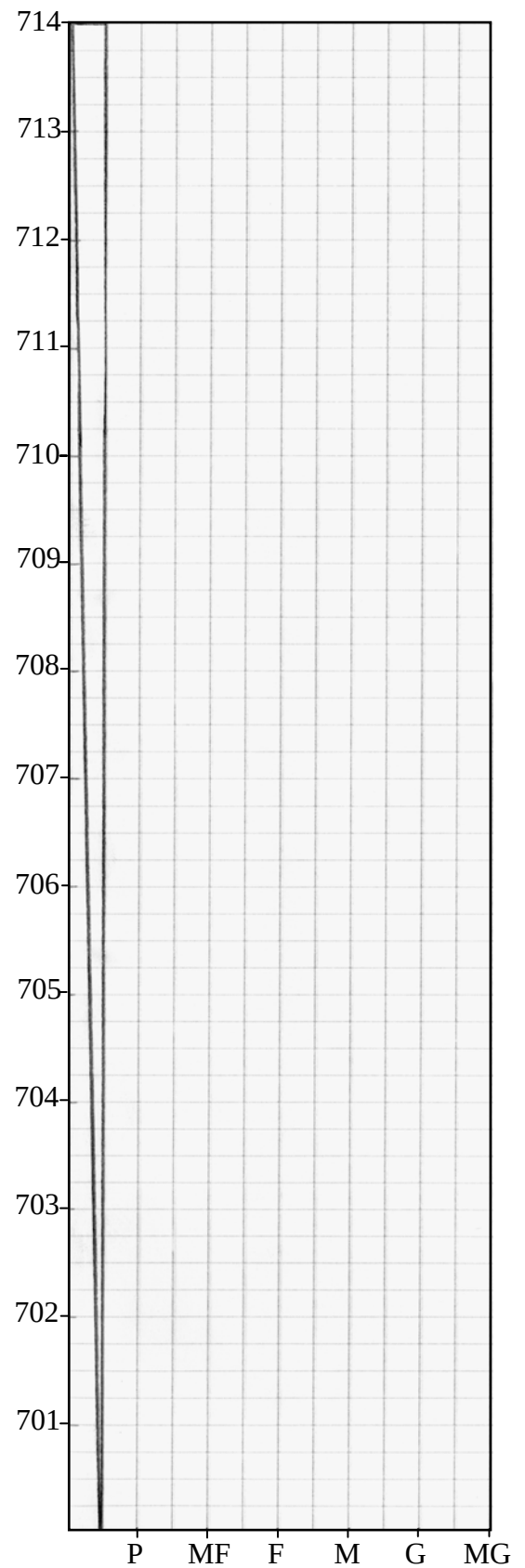
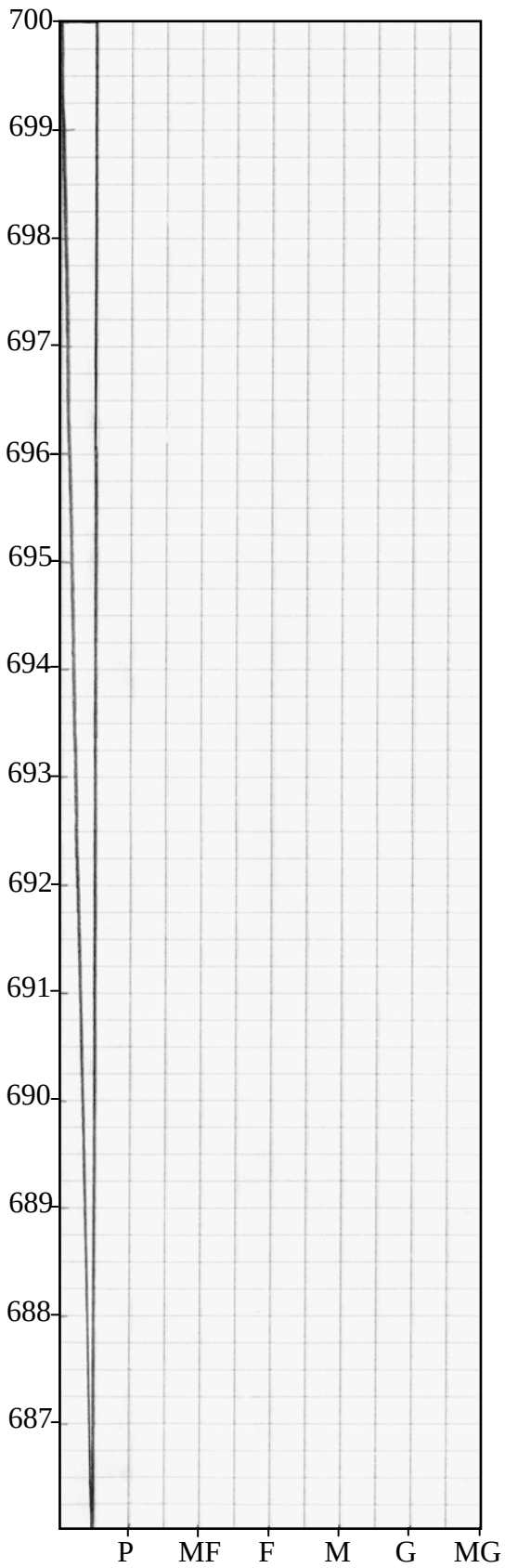
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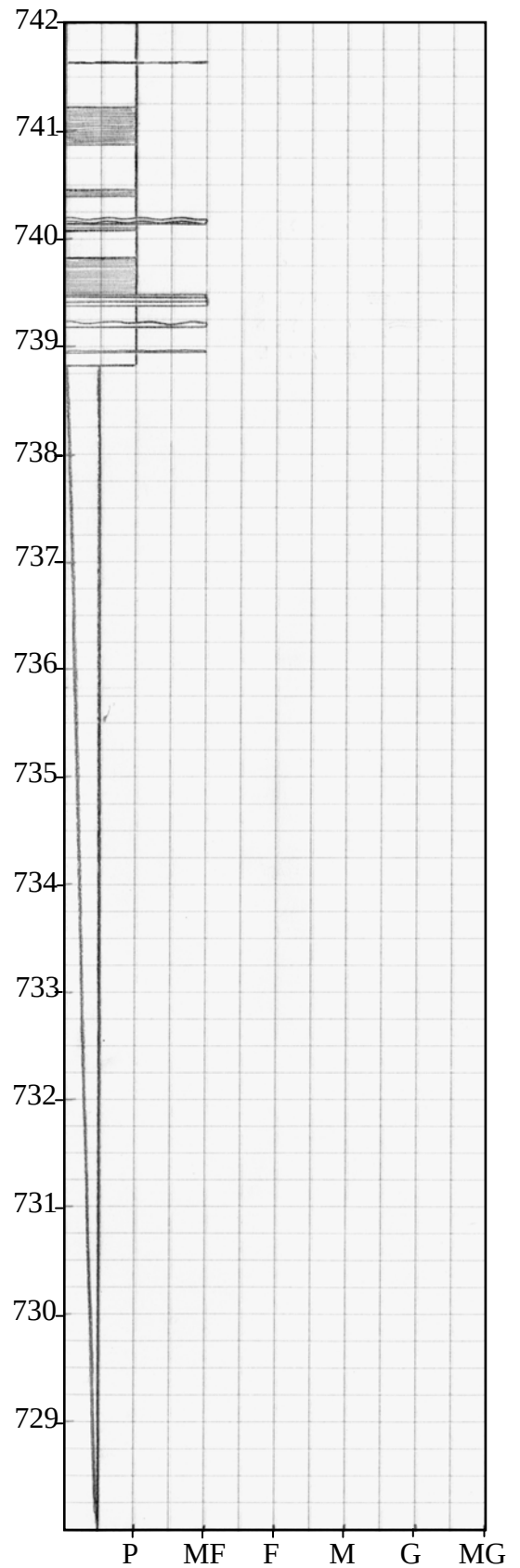
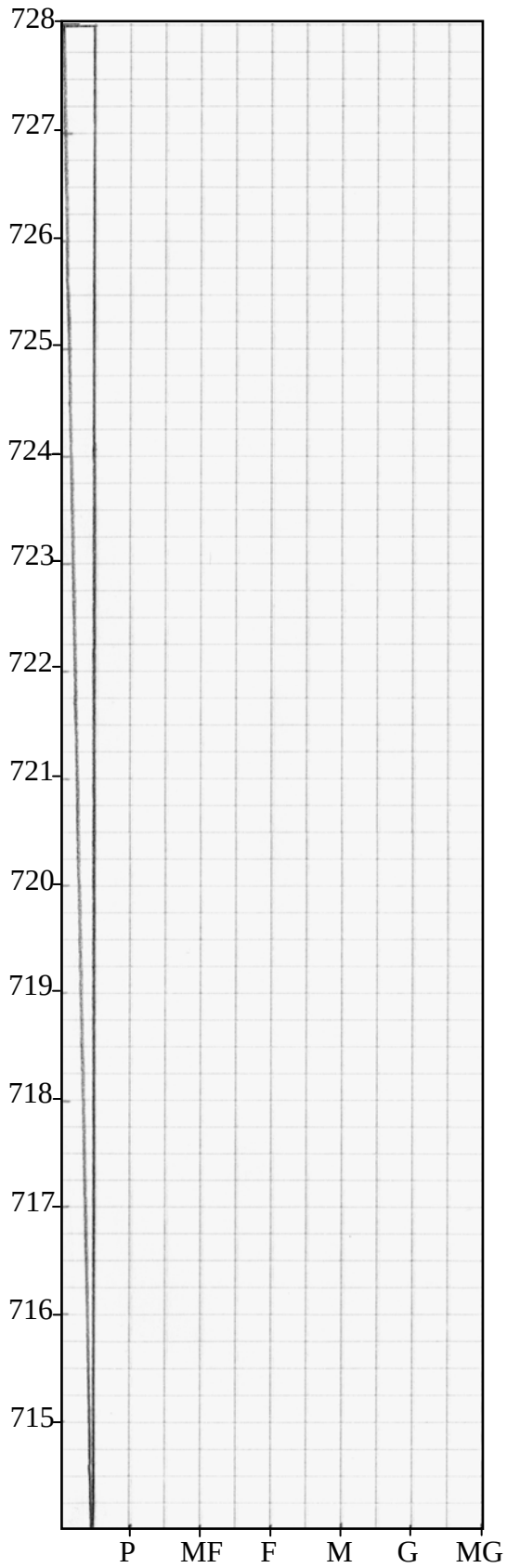
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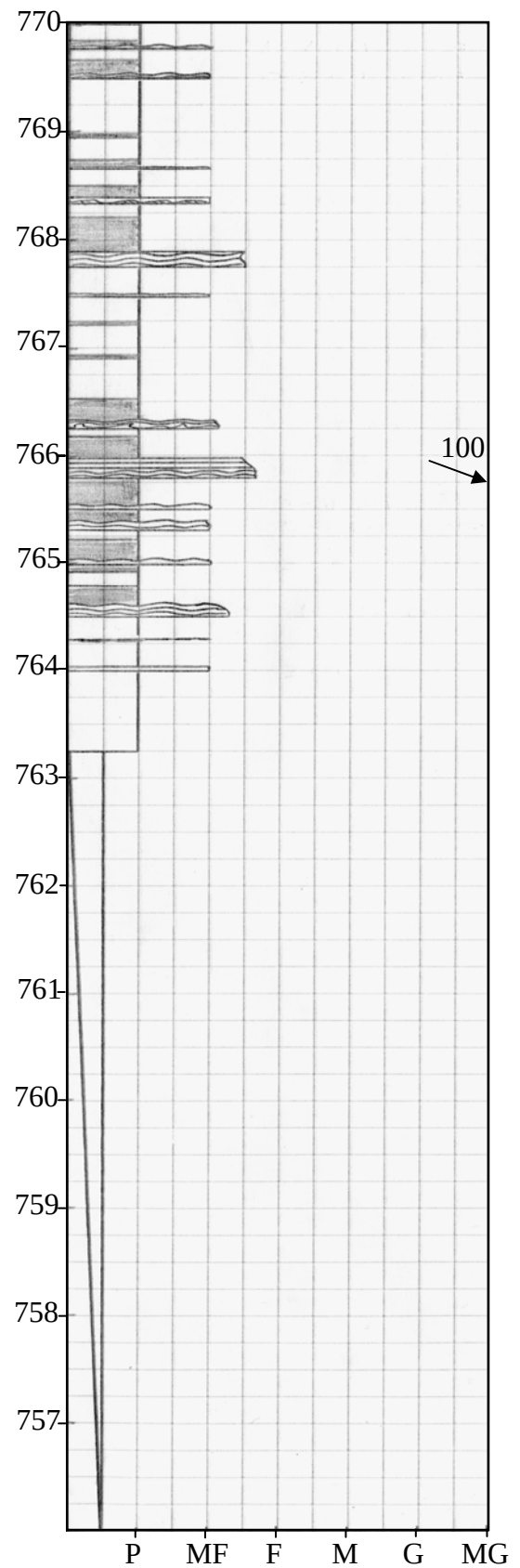
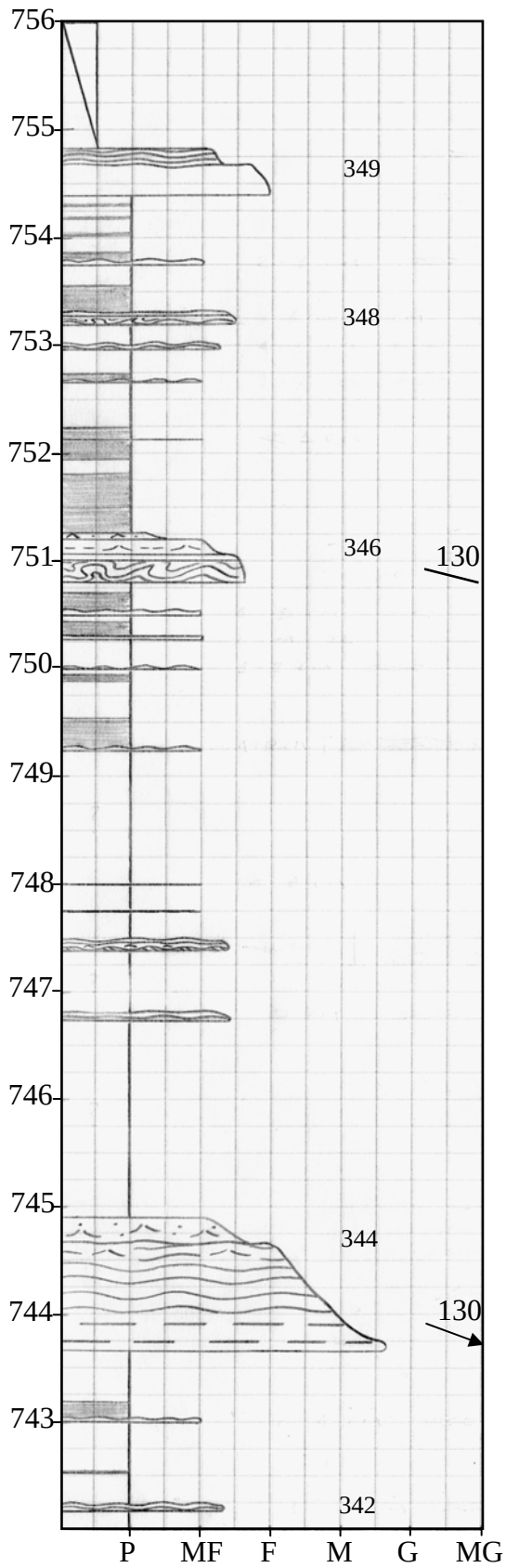
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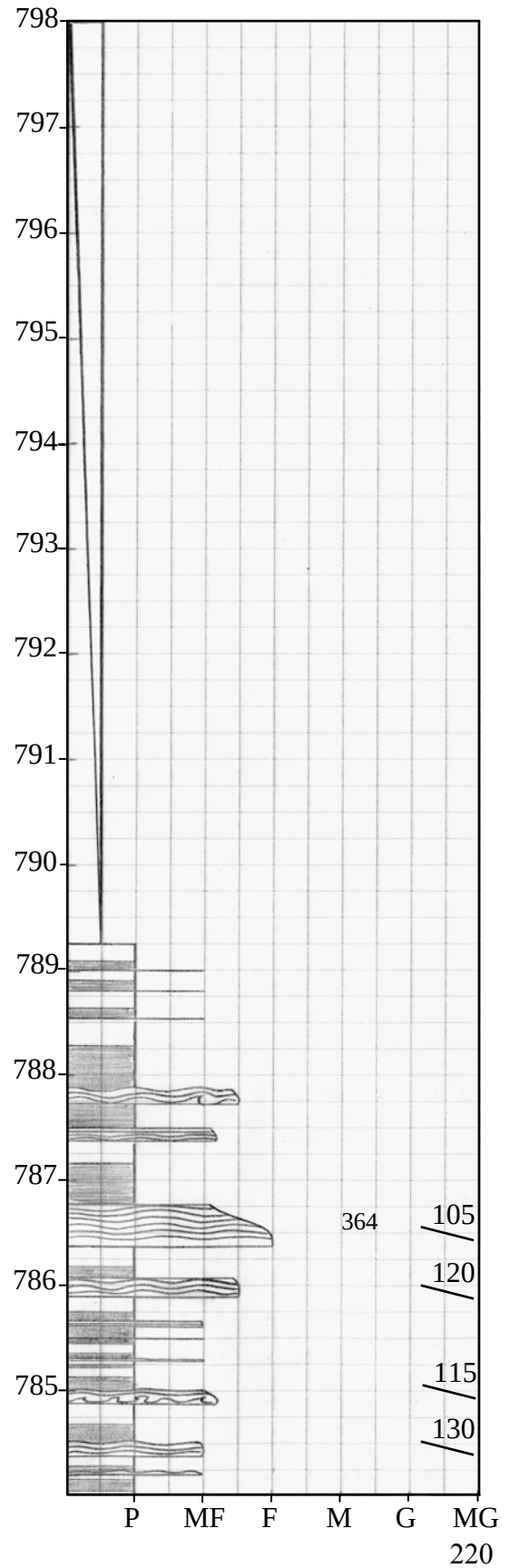
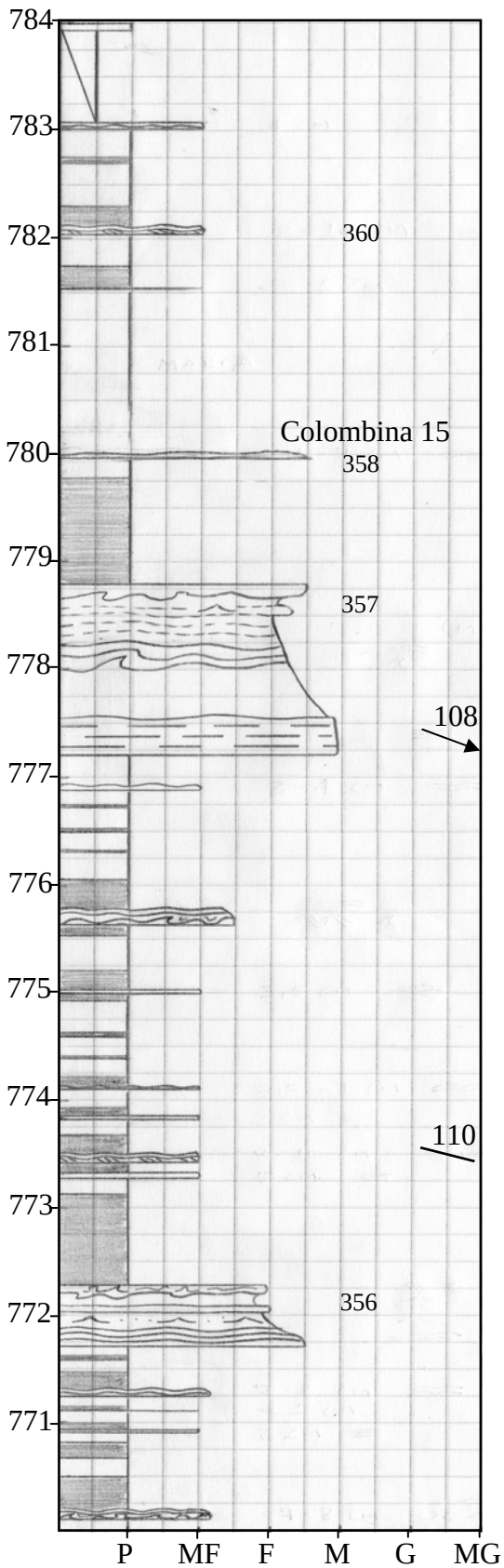
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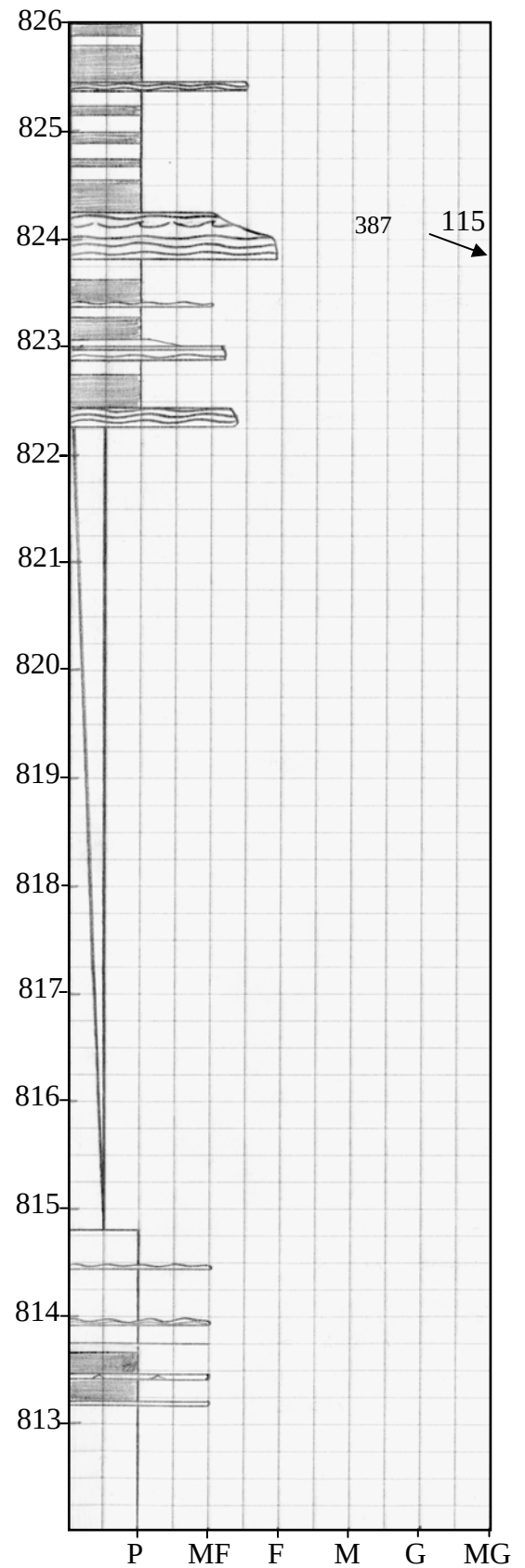
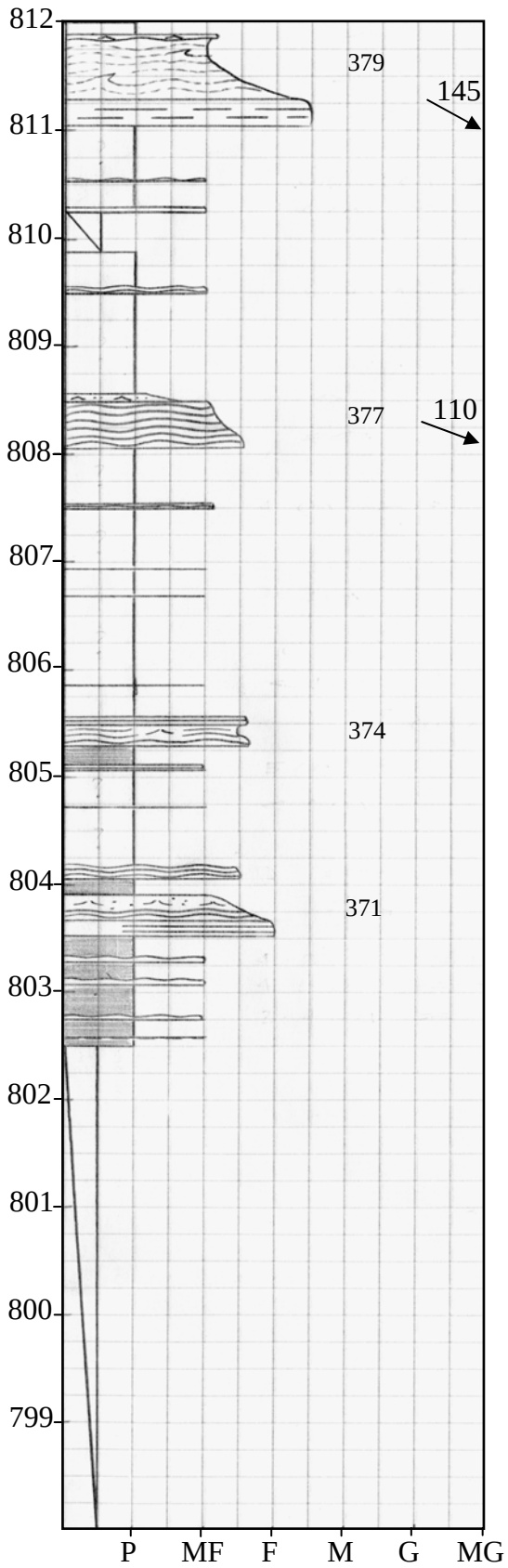
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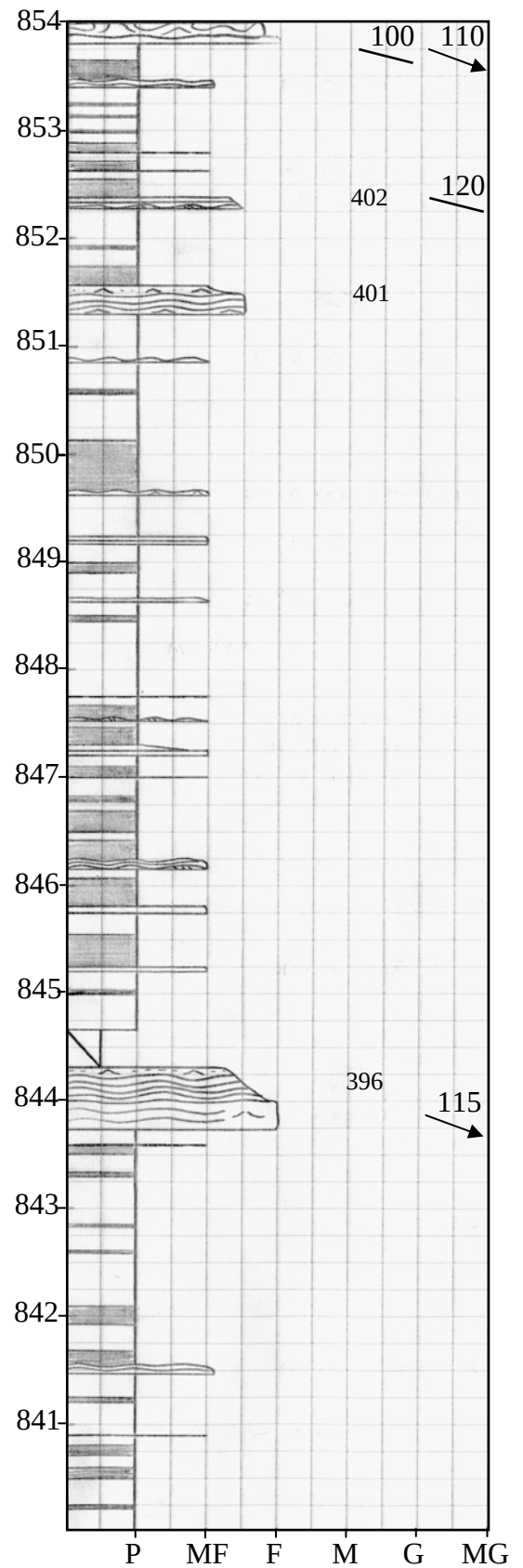
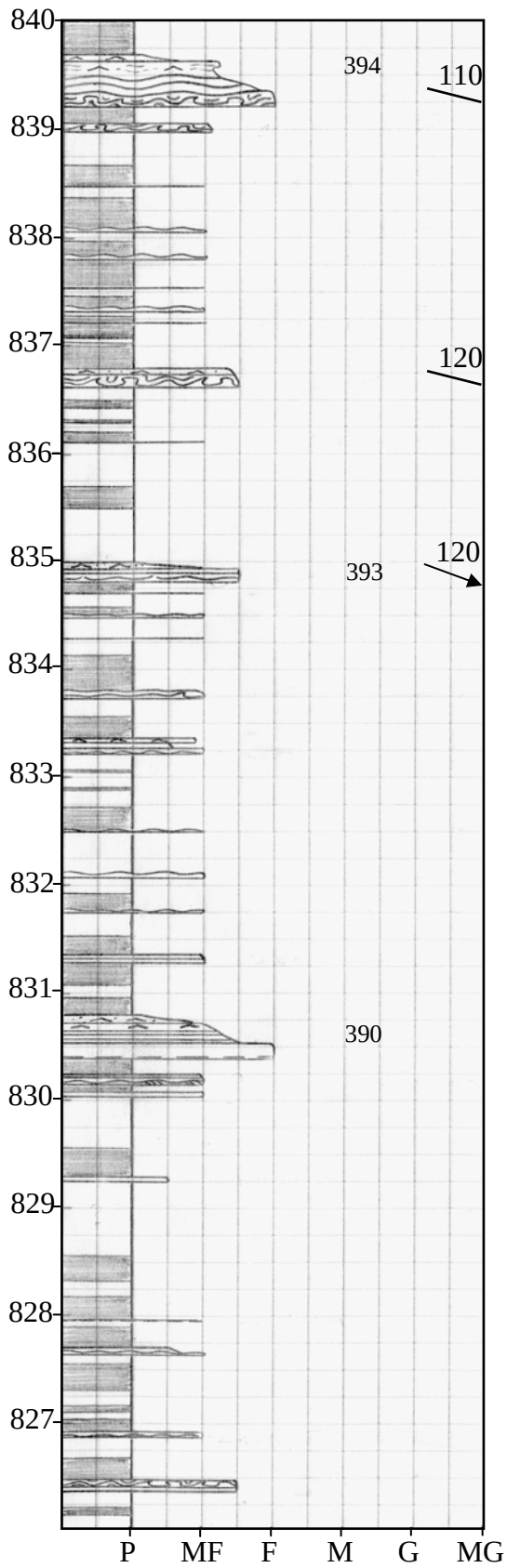
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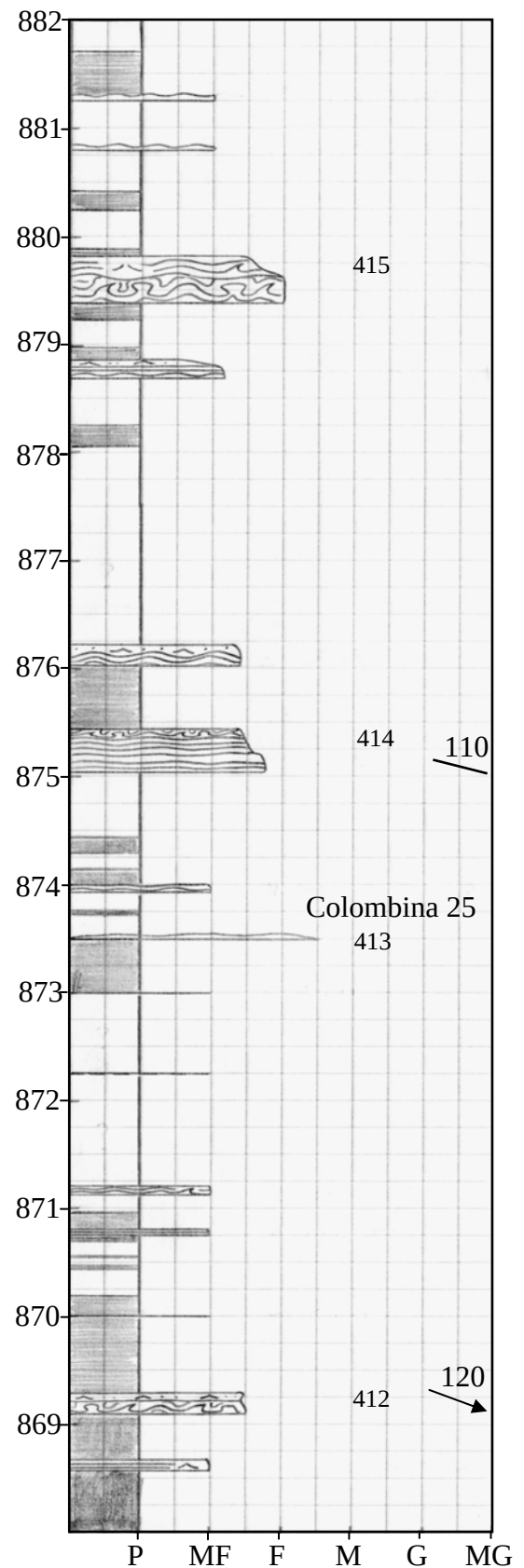
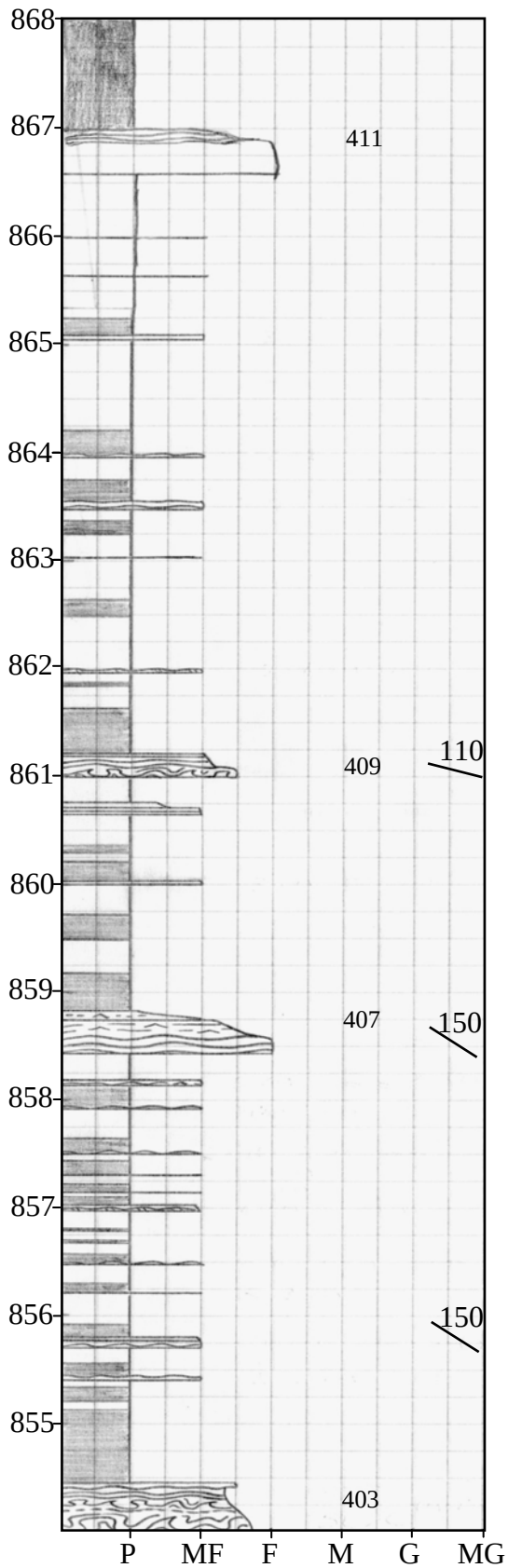
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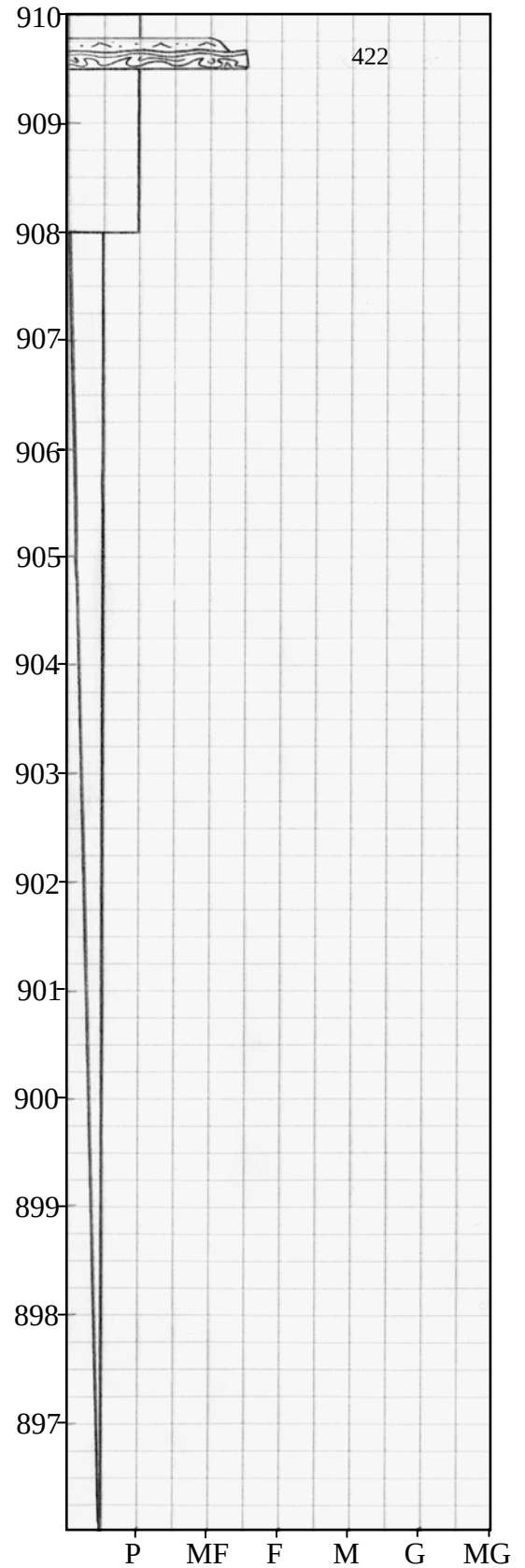
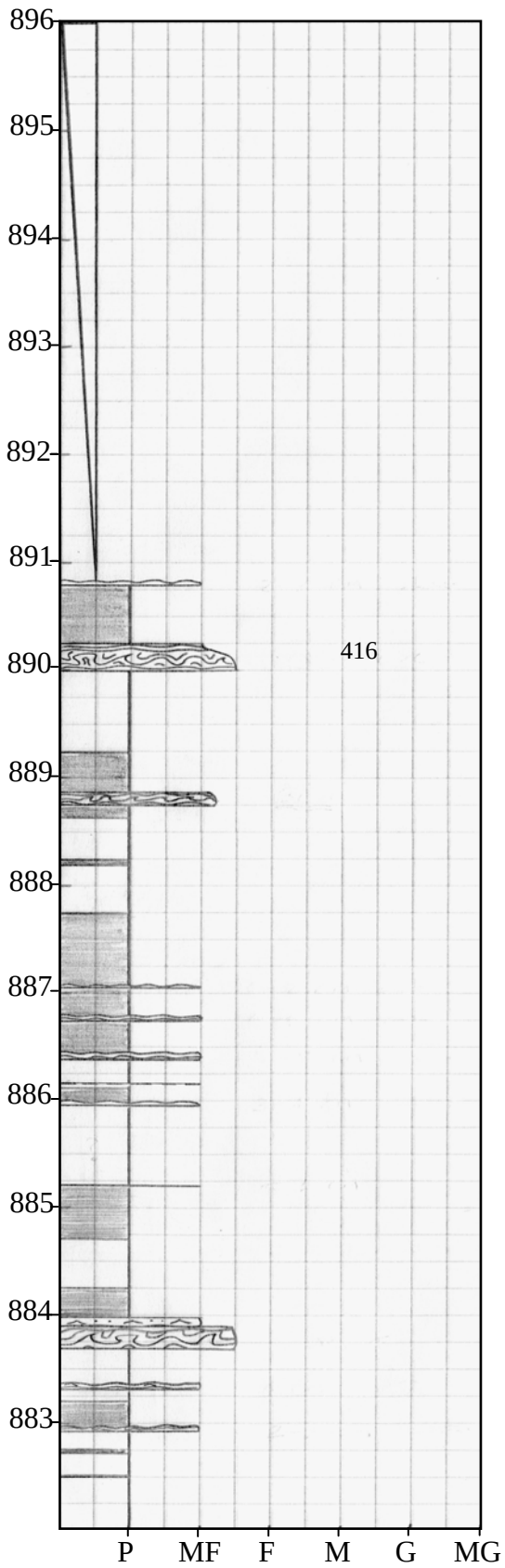
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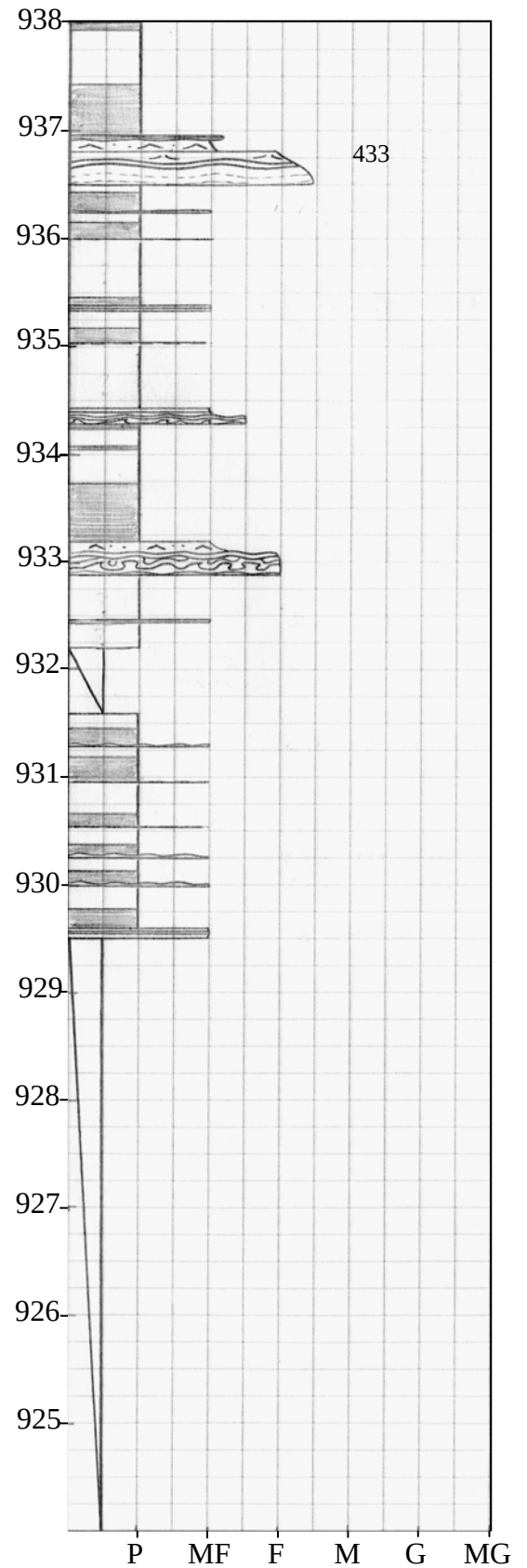
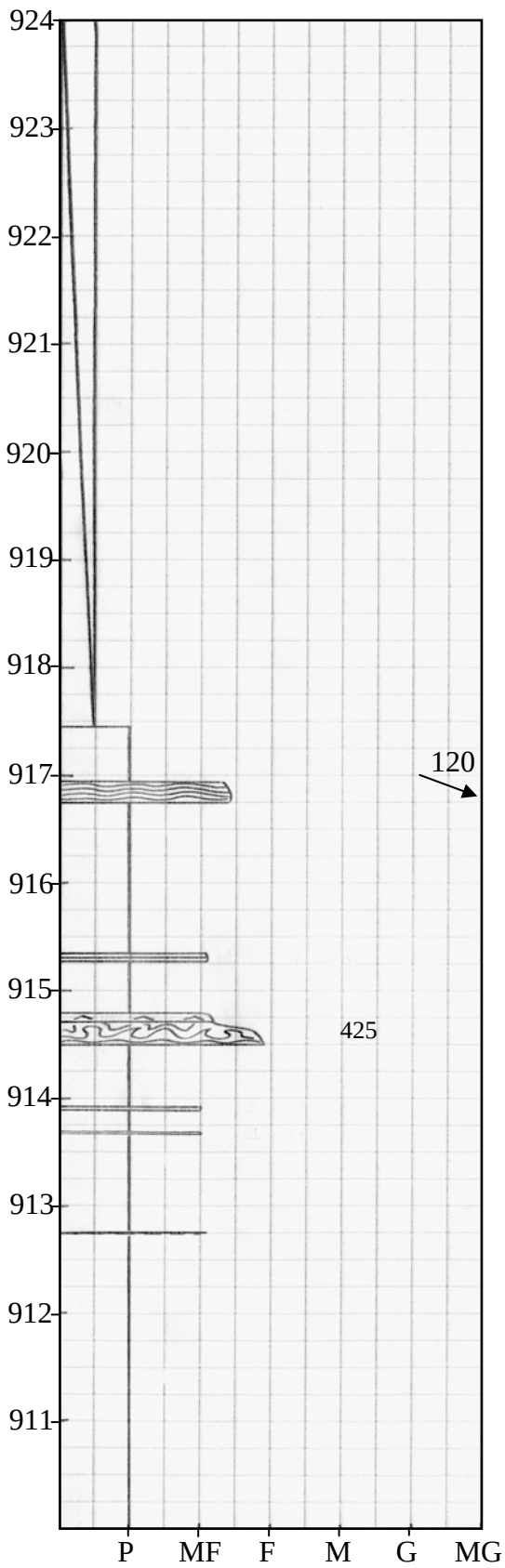
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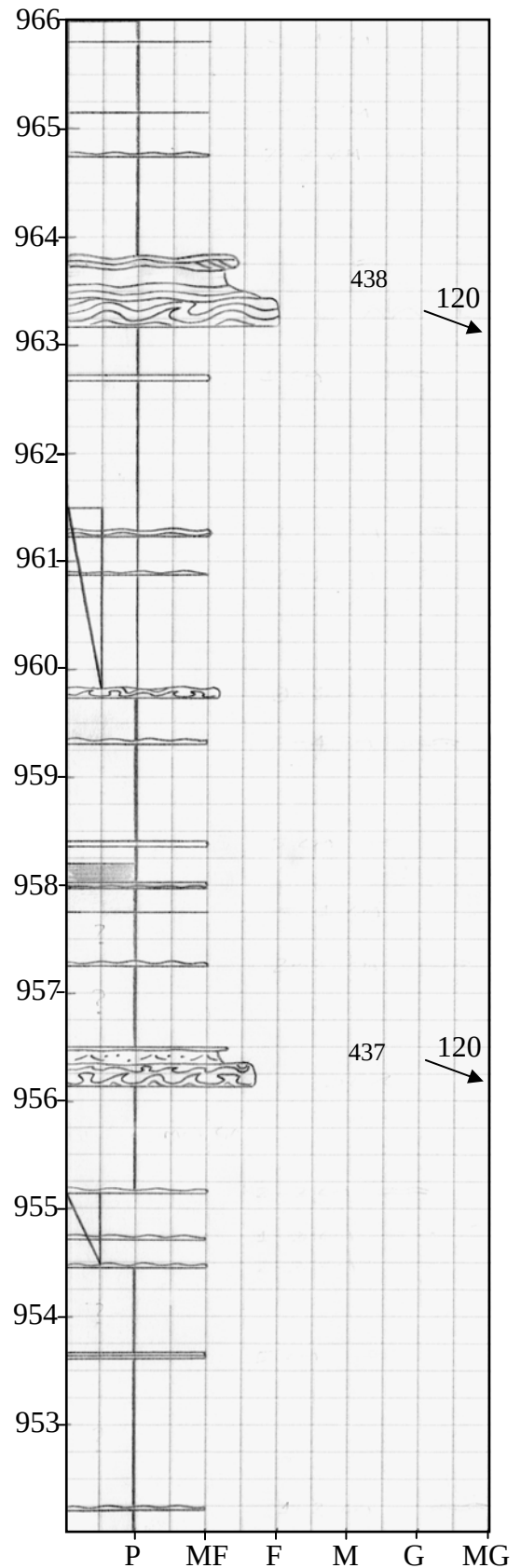
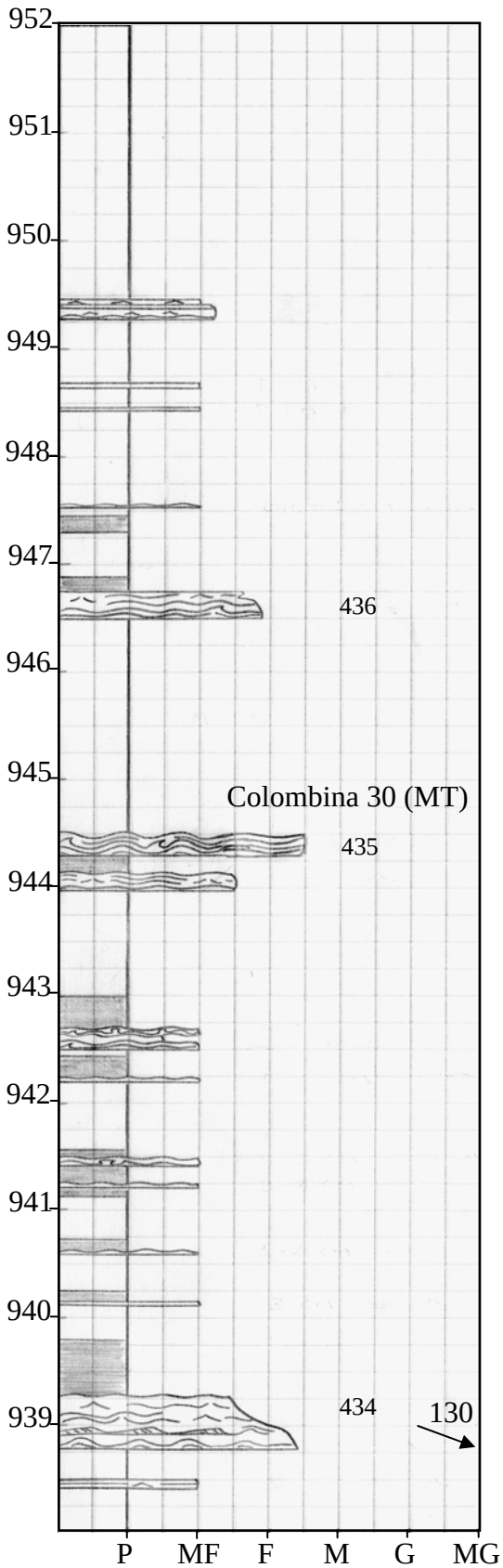
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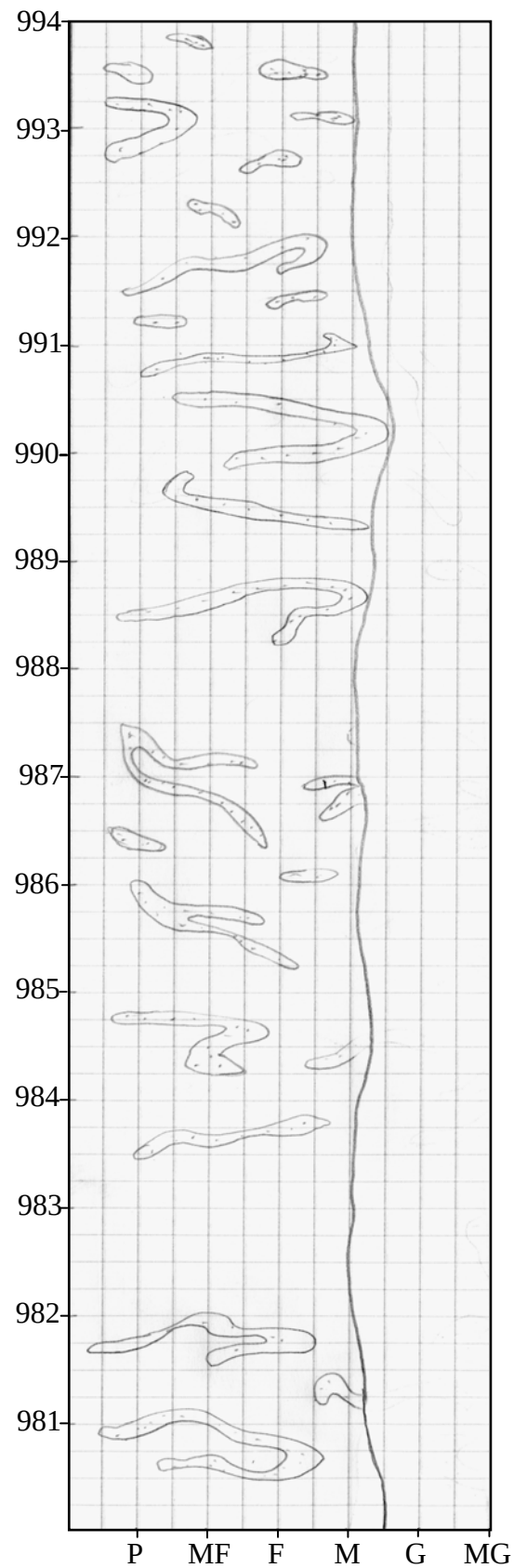
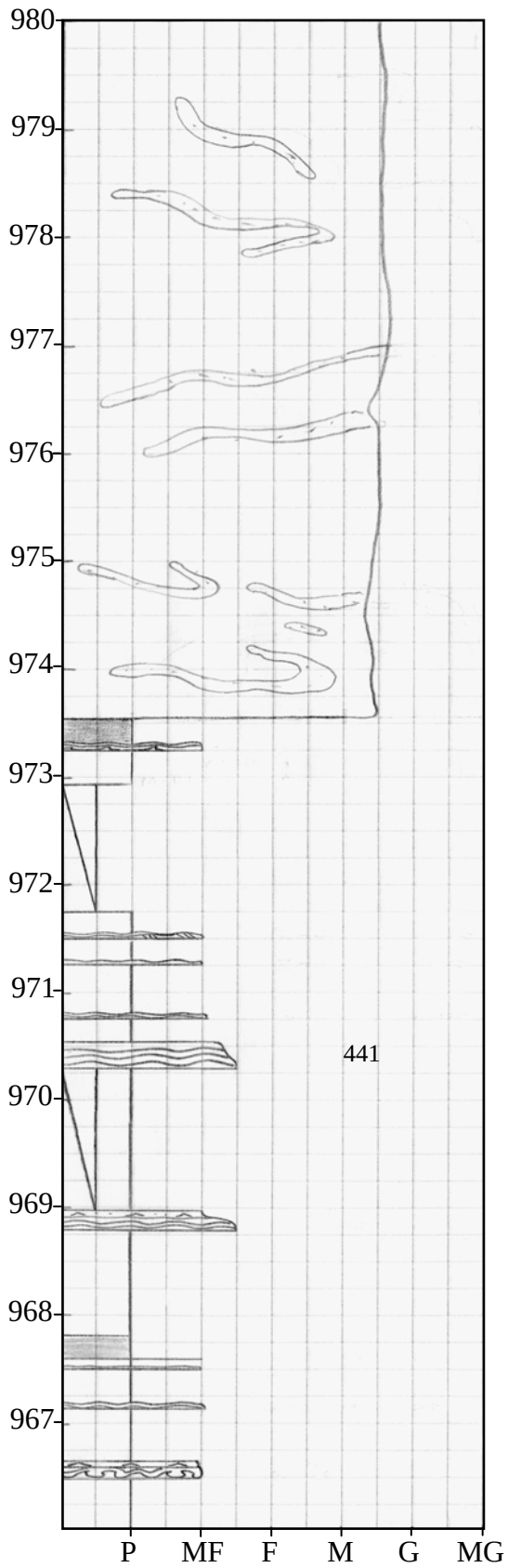
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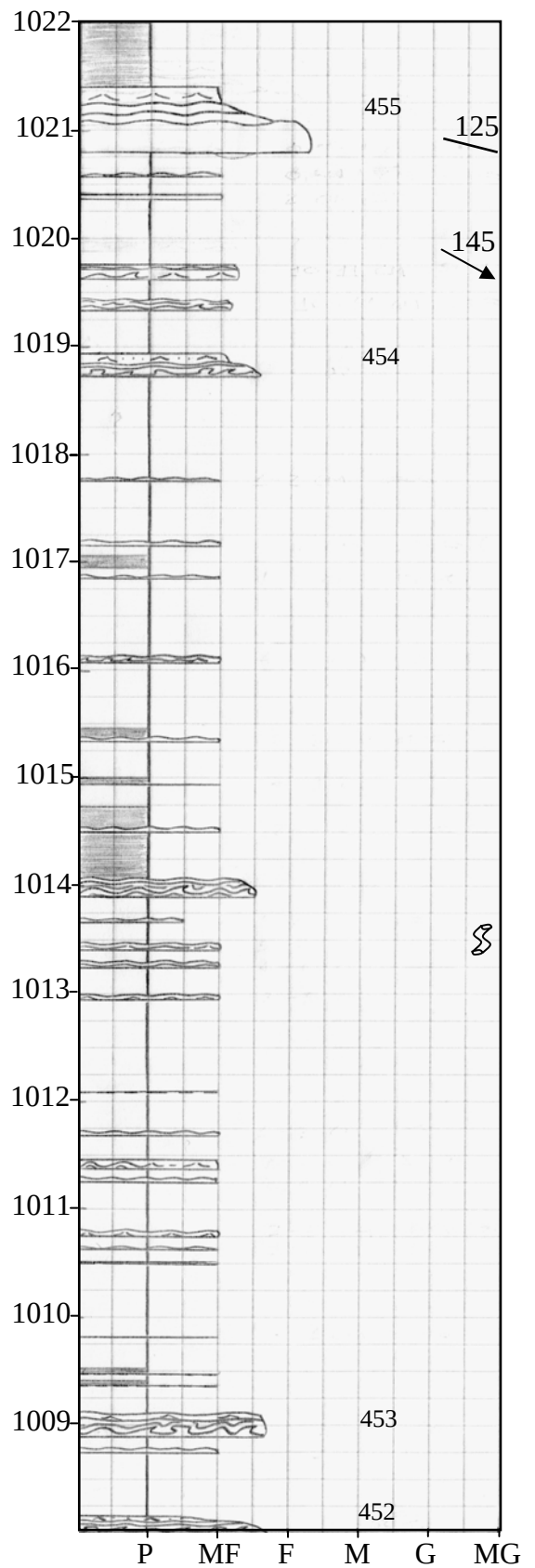
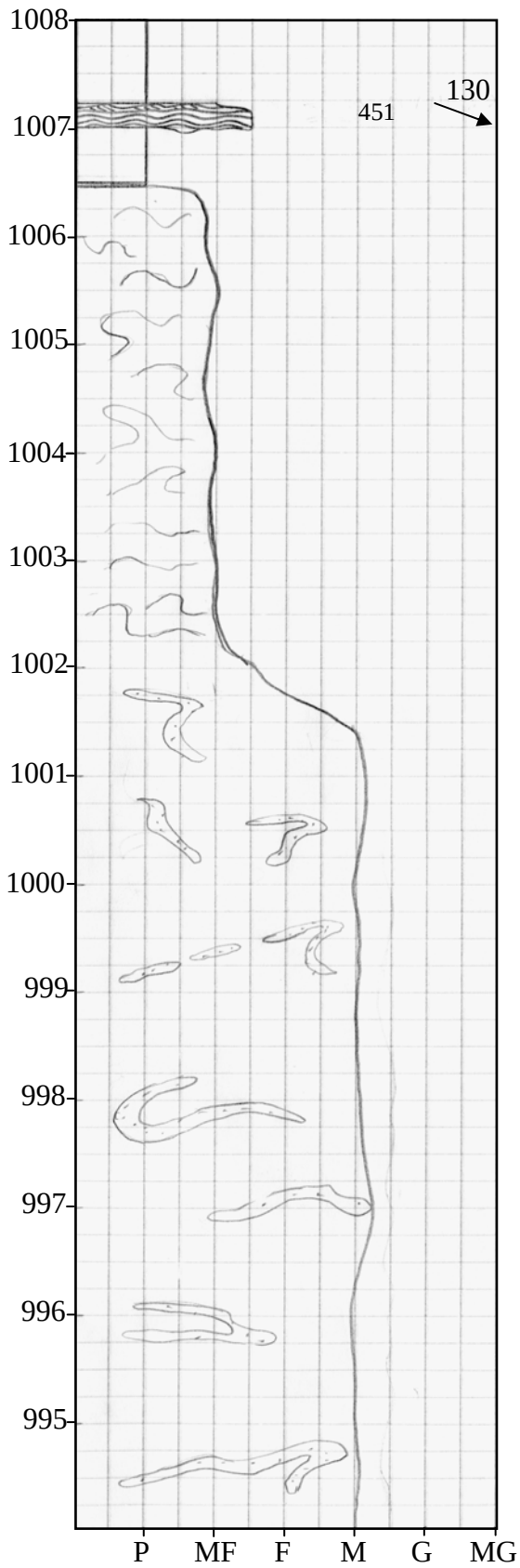
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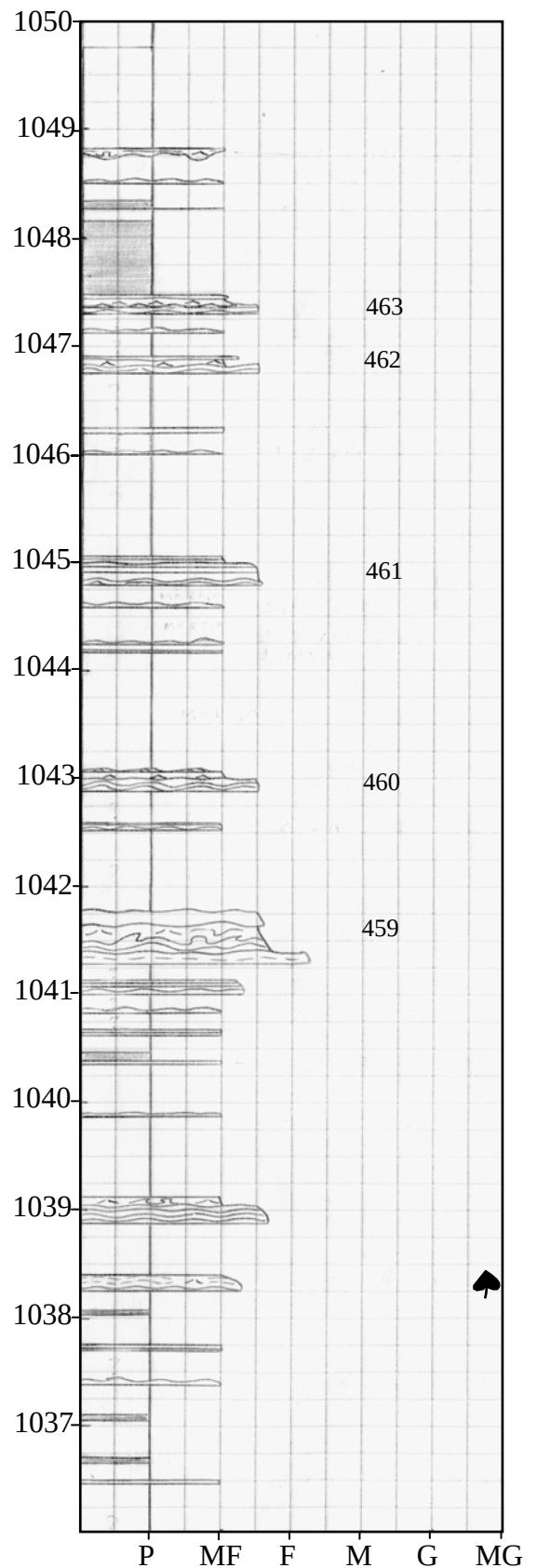
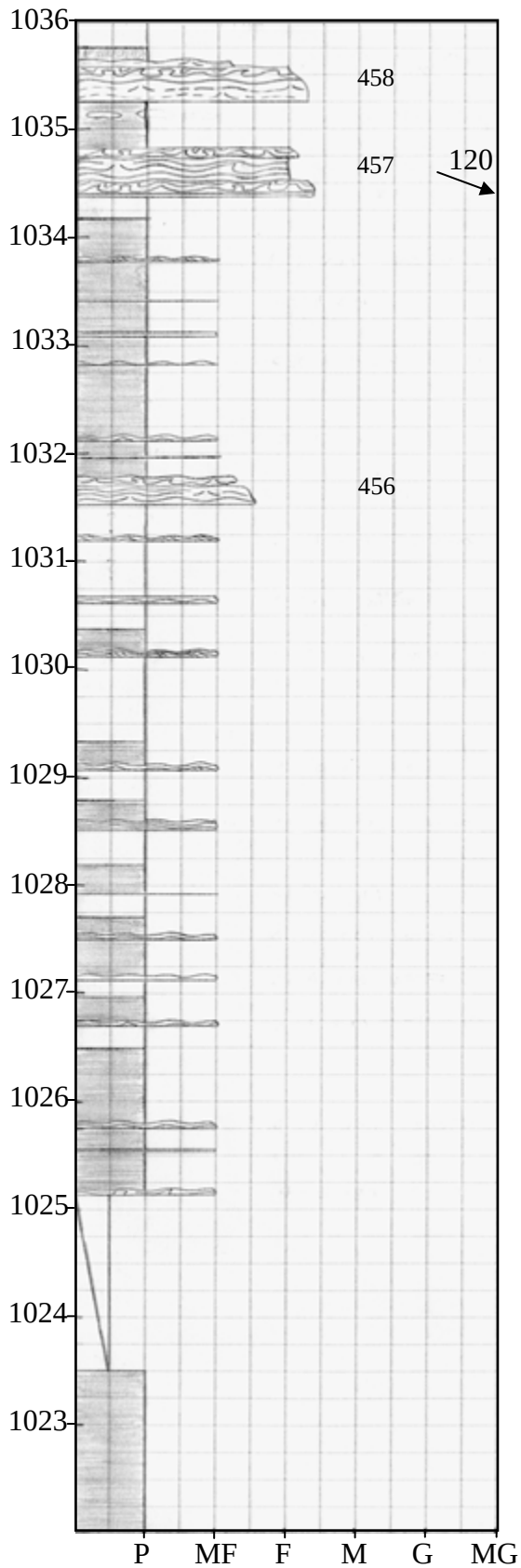
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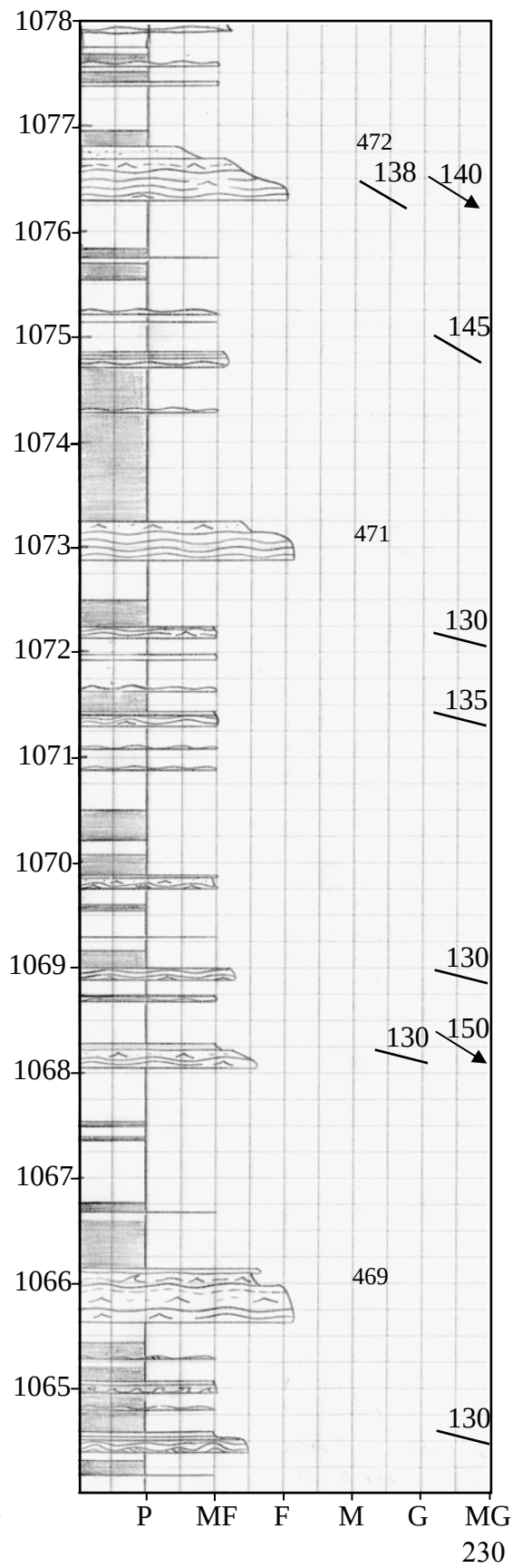
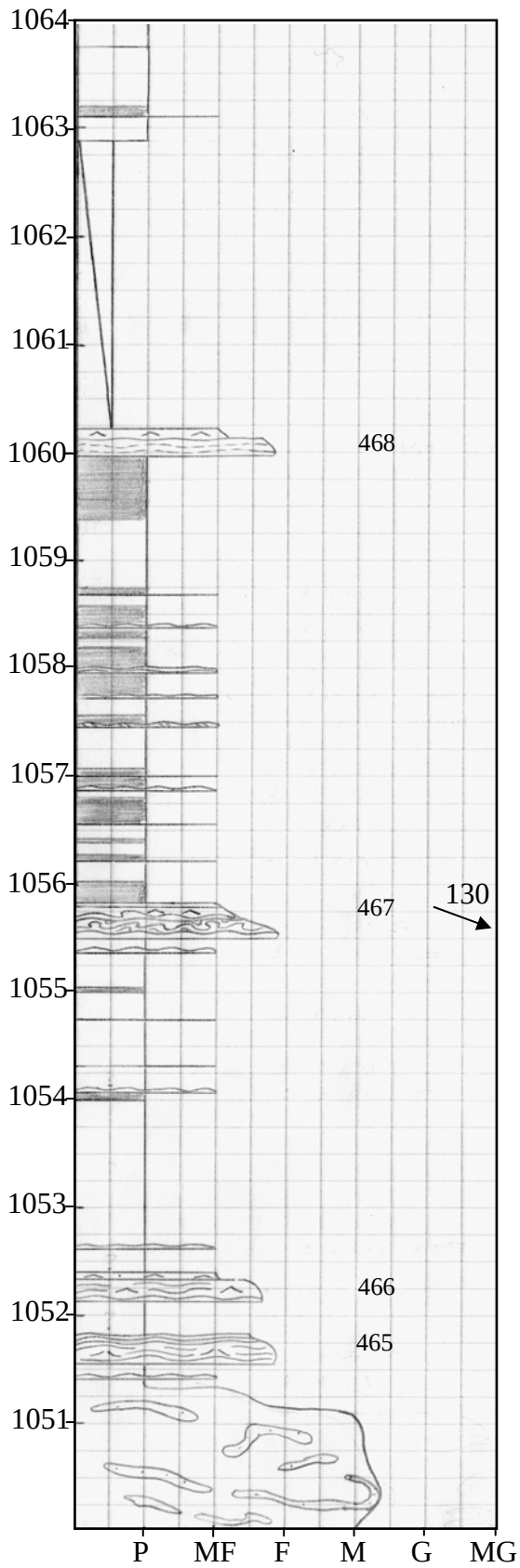
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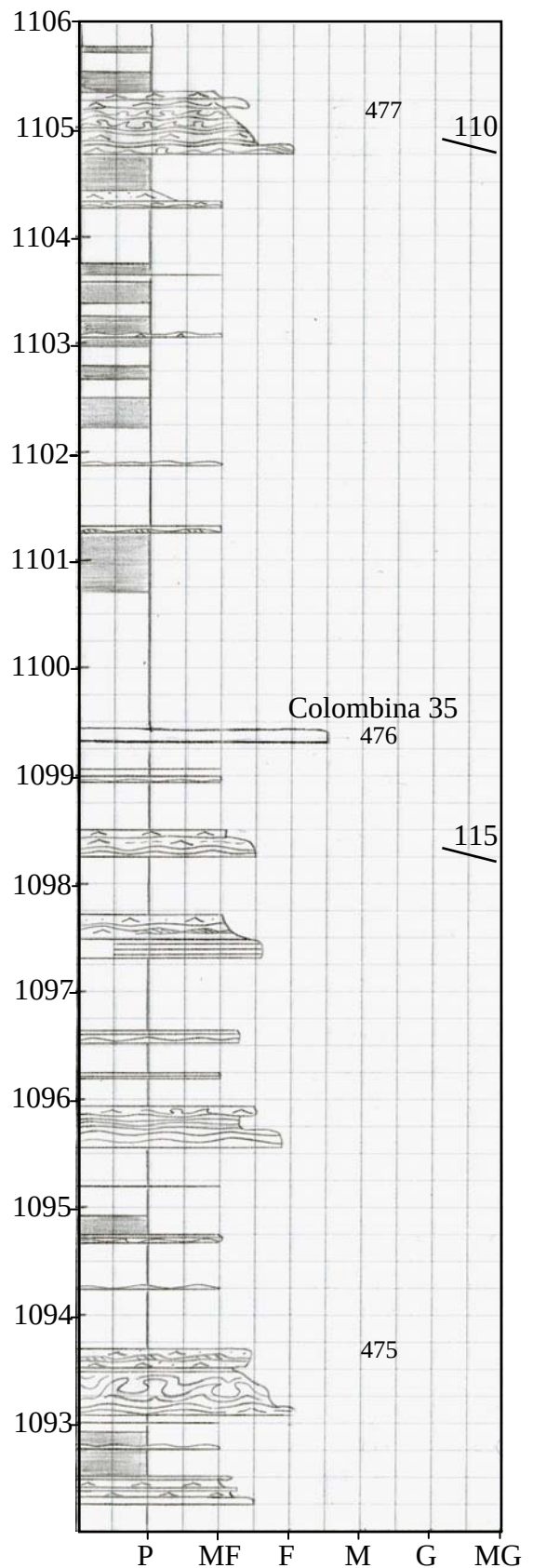
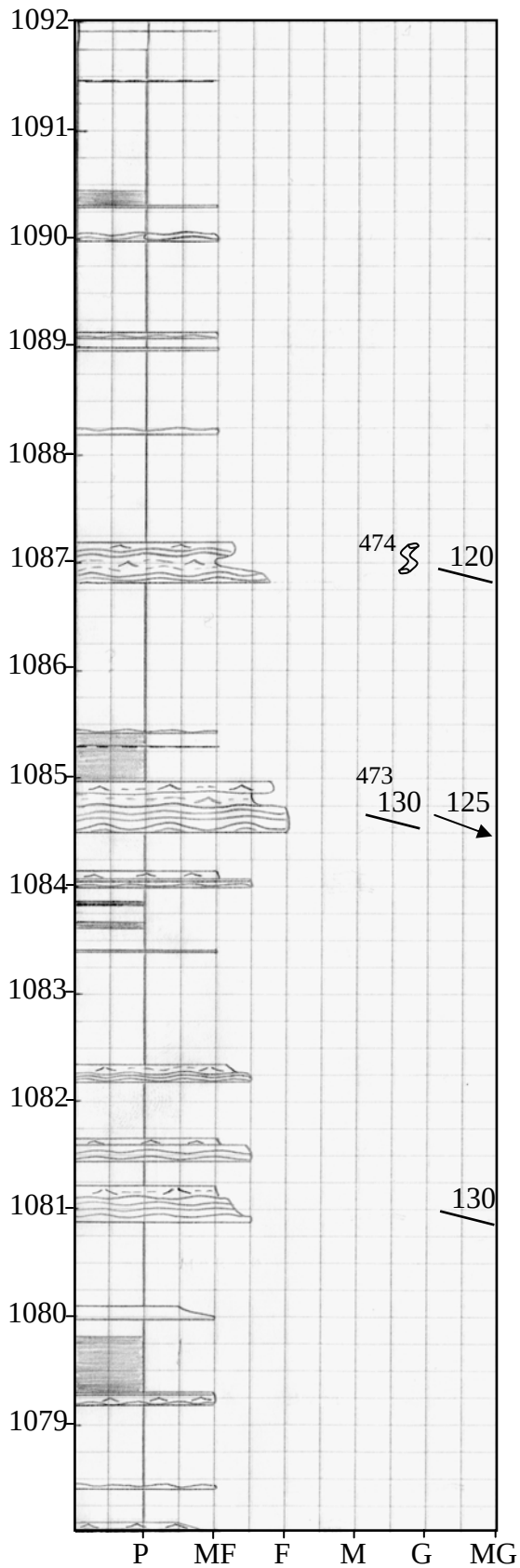
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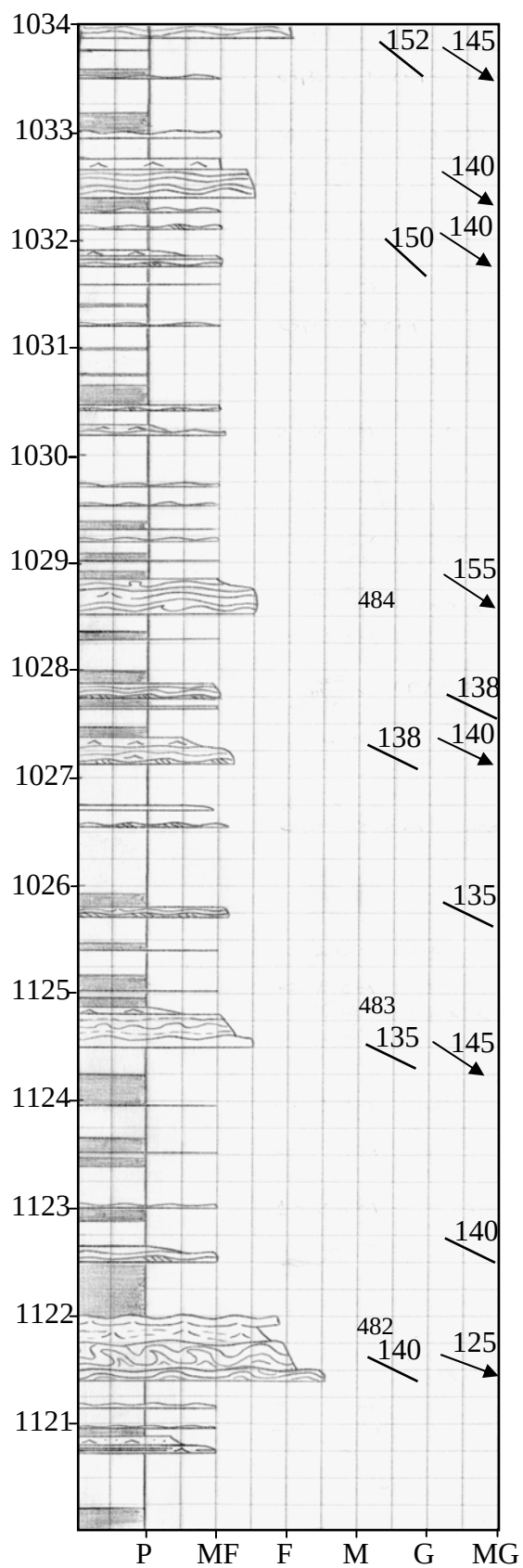
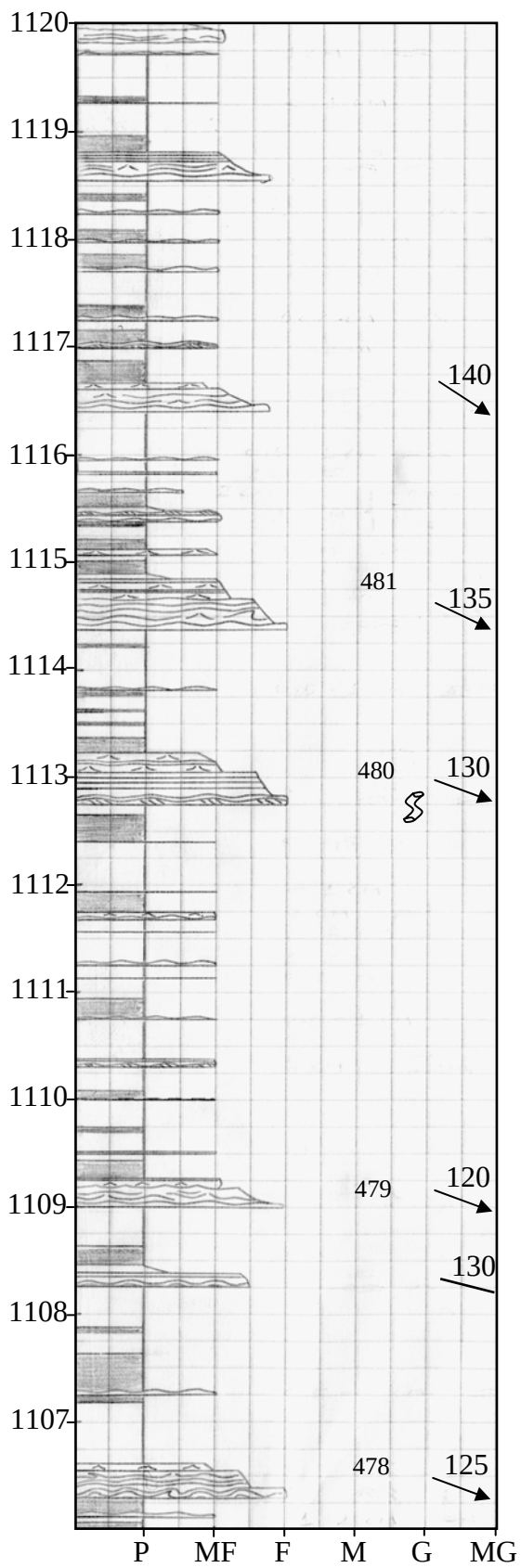
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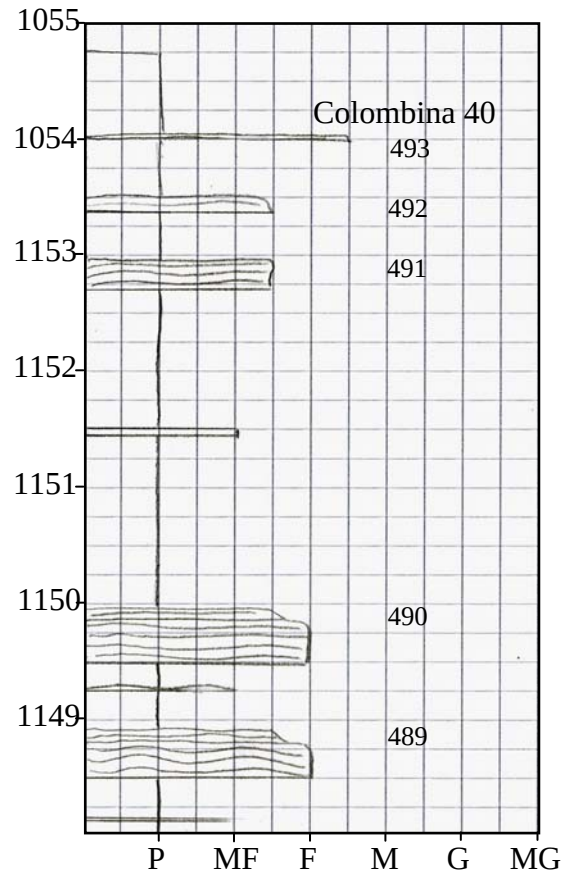
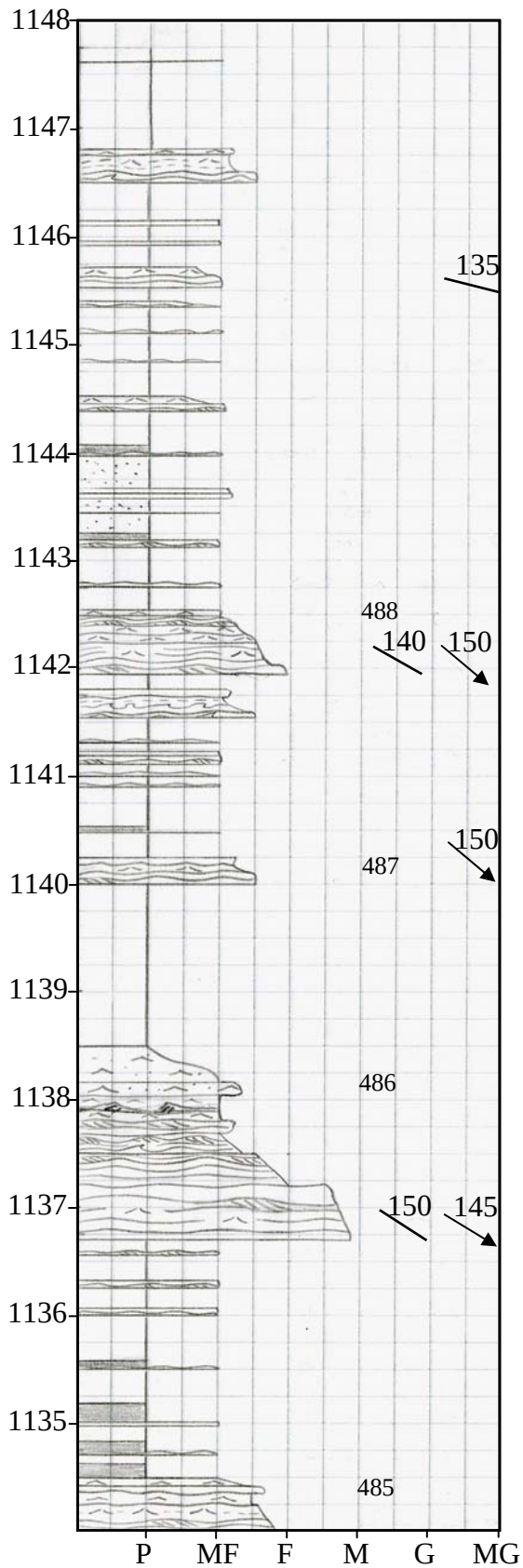
Sezione F



Sezione F



Sezione F



Sezione G

La sezione G, caratterizzata da uno spessore totale di 644 m, è stata ottenuta lungo la strada FC 135, vicino alla località di Tivo, a sud-ovest del paese di Sarsina (Fig. 9). In questa zona gli strati affiorano molto bene grazie alla loro giacitura rovesciata ed inclinazione ad alto angolo, il che ha permesso di eseguire dettagliate analisi di paleocorrenti grazie all'ottima esposizione delle forme di fondo.

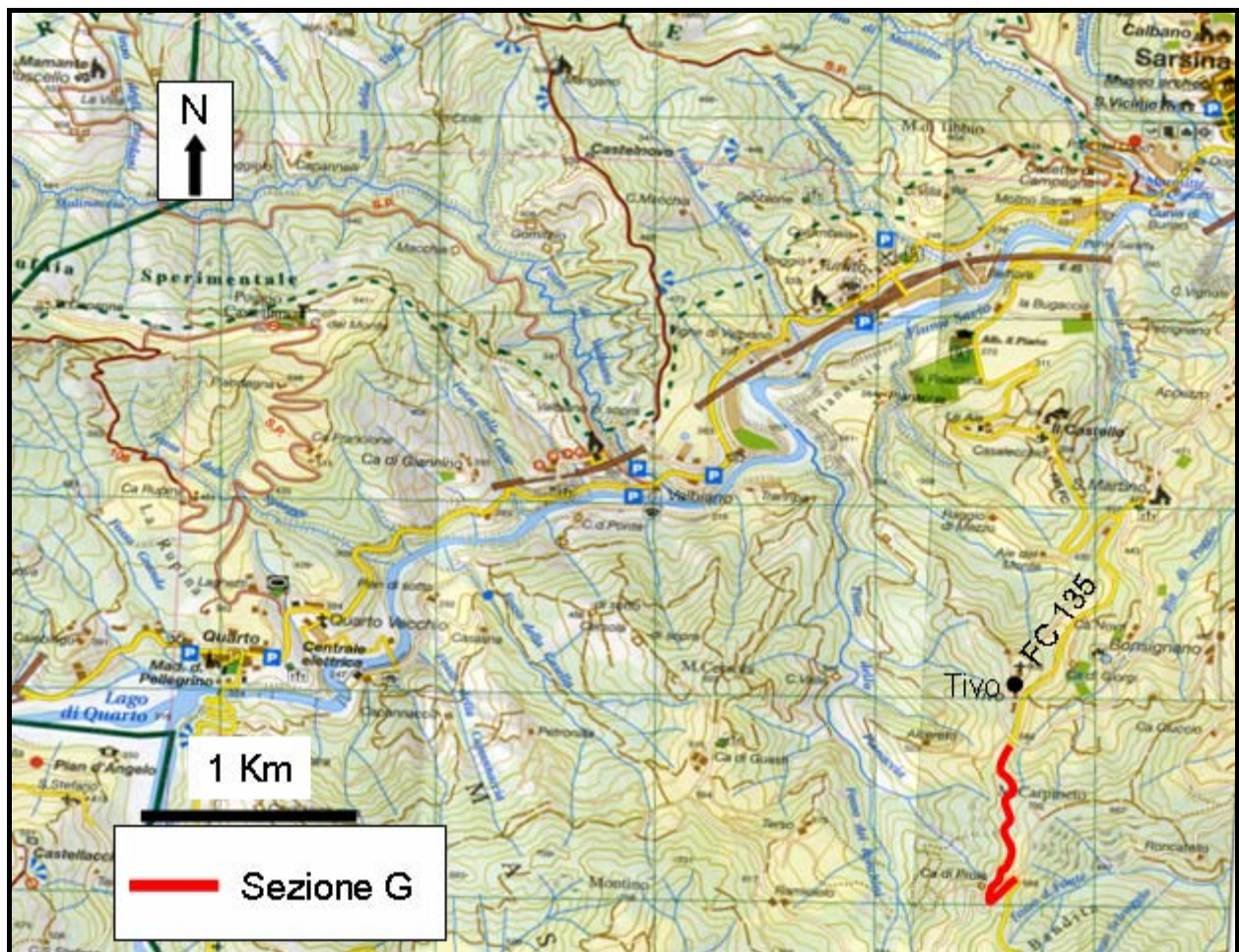
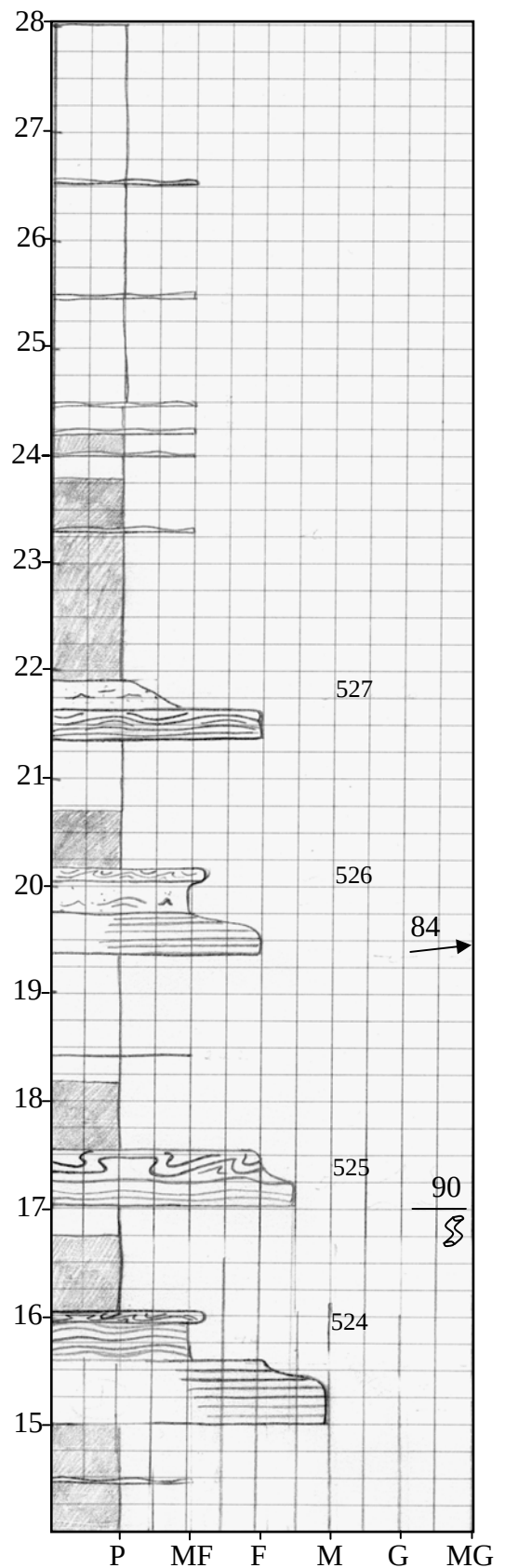
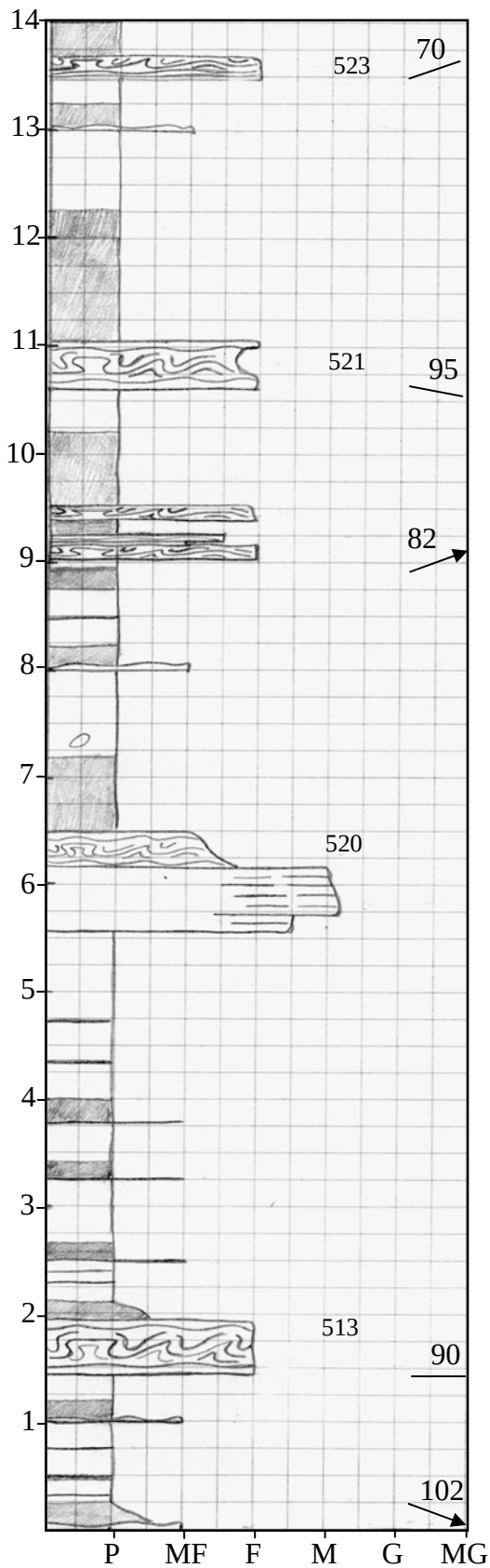
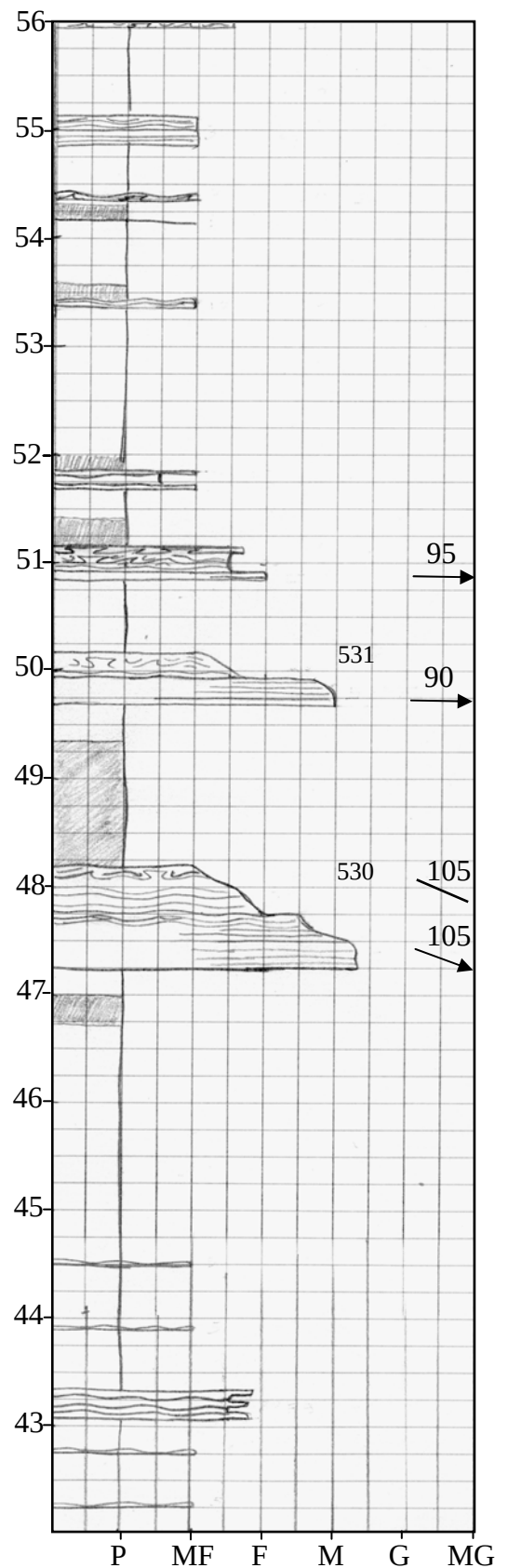
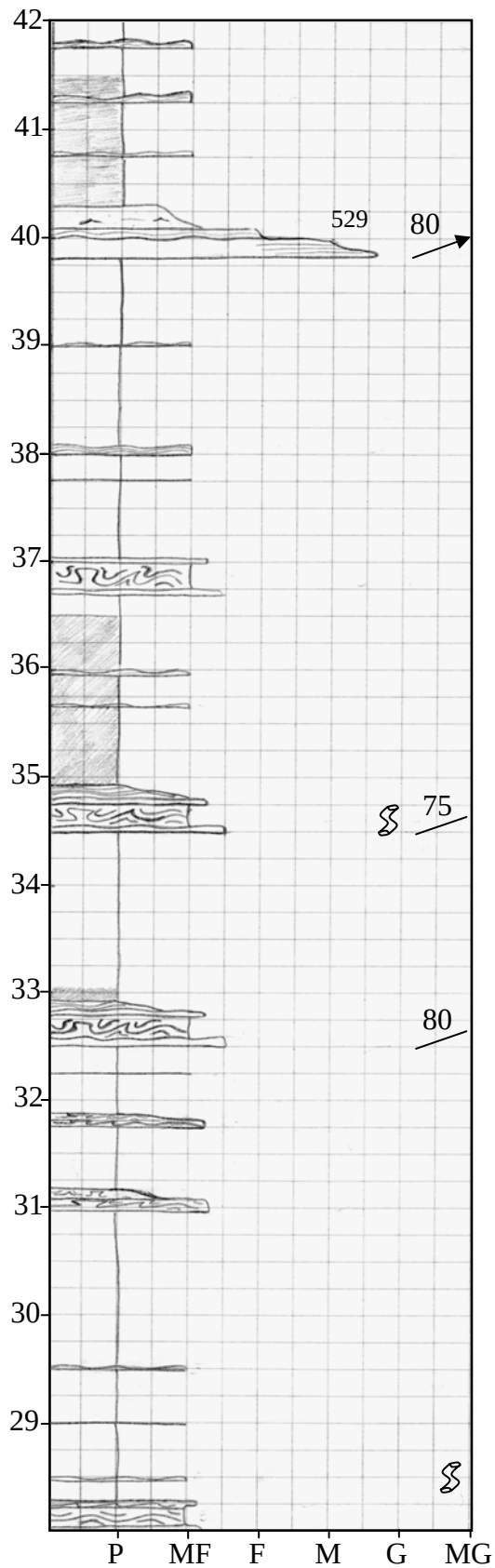


Figura 9- Mappa di localizzazione della sezione G, Valle del Savio.

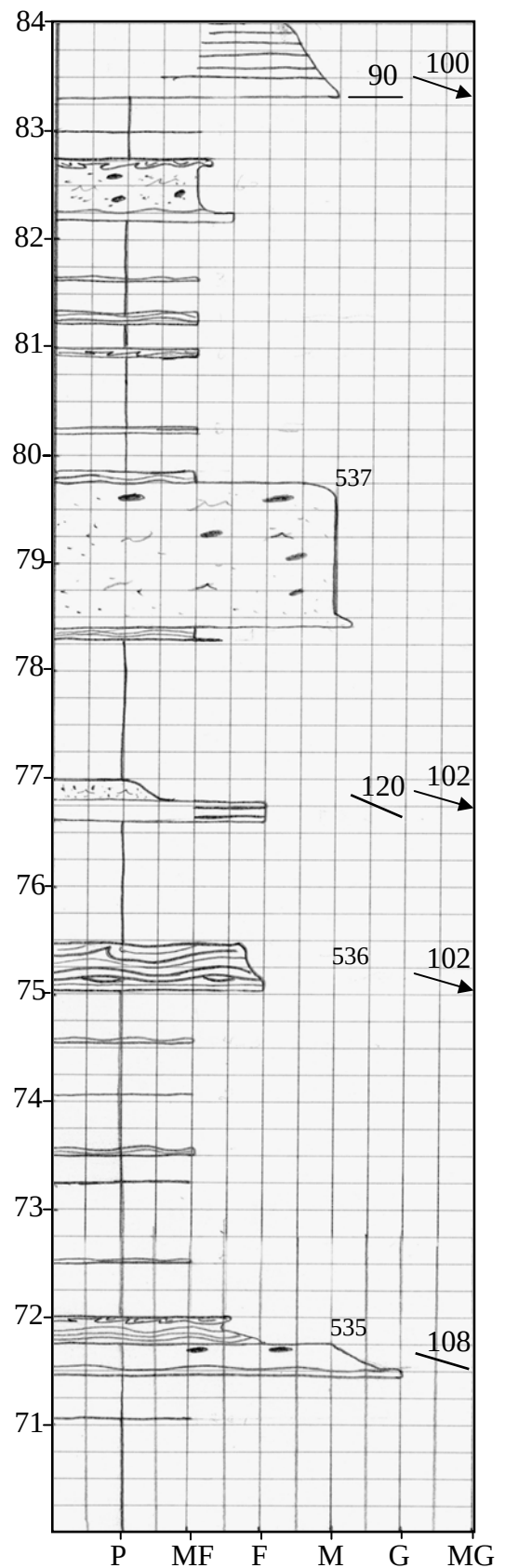
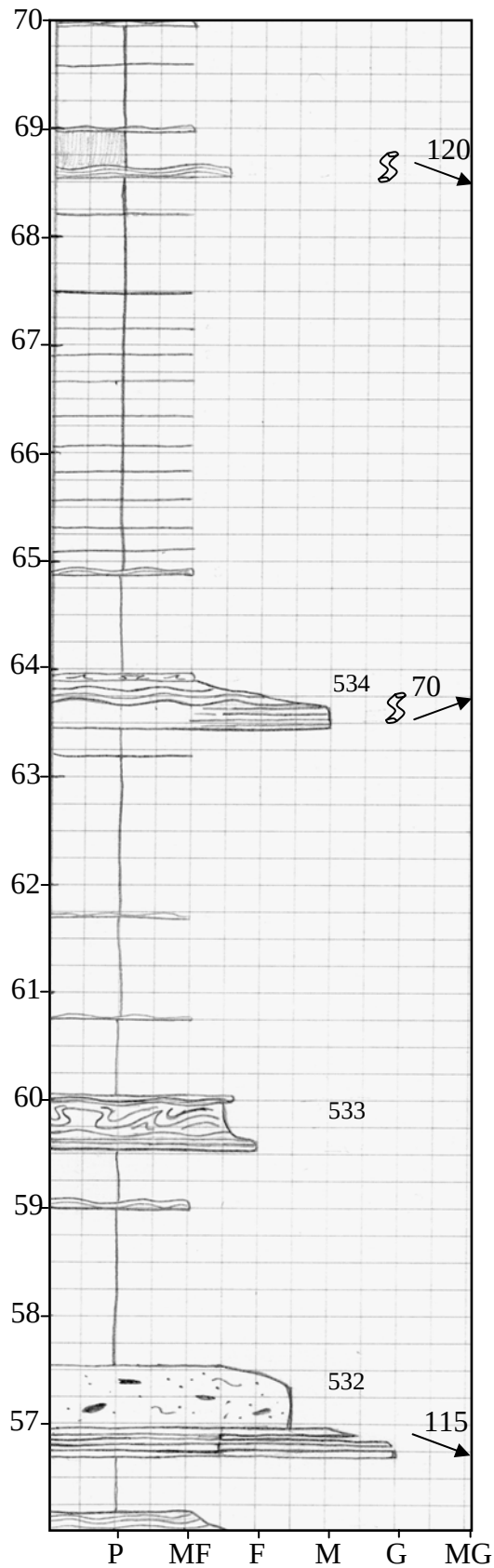
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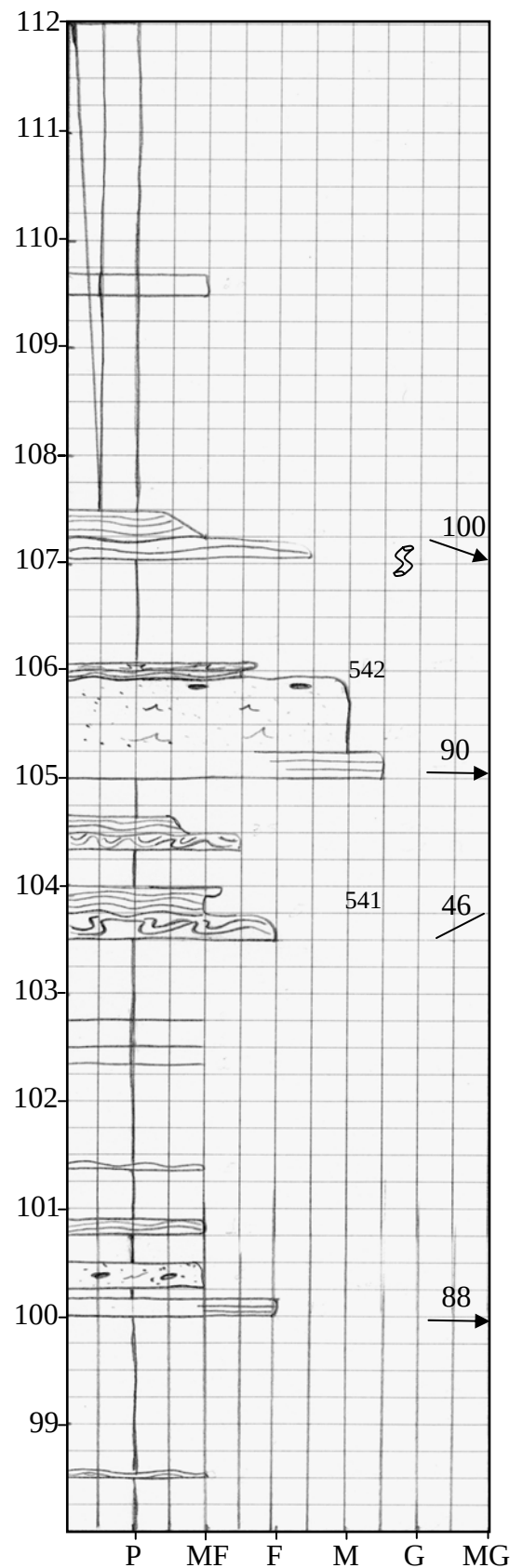
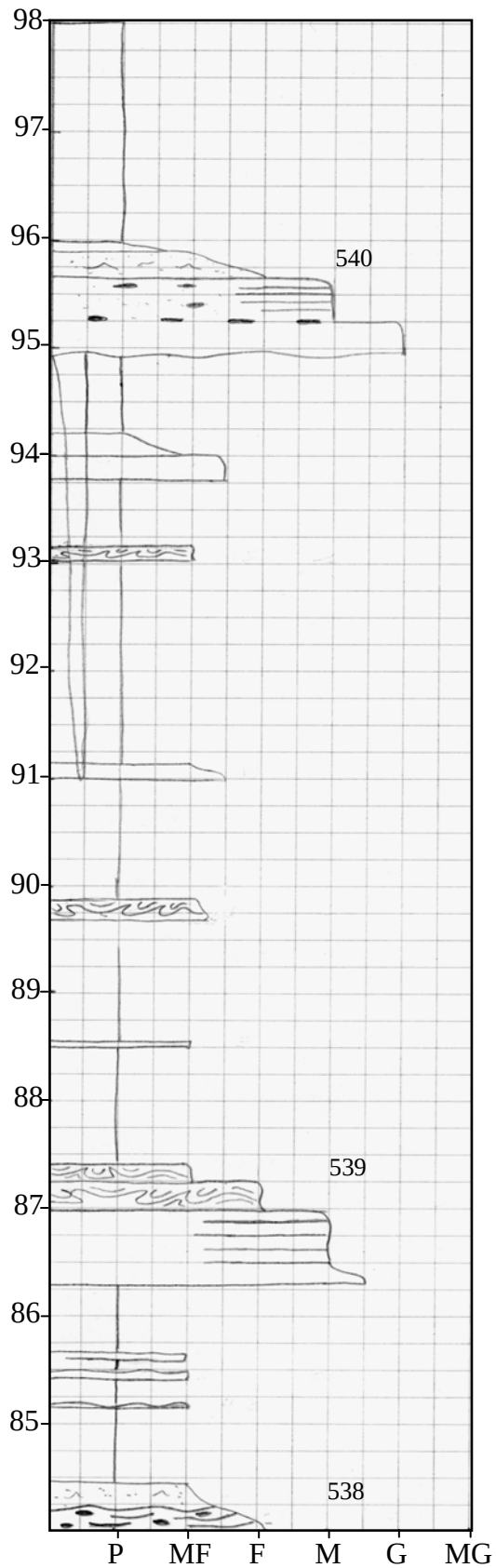
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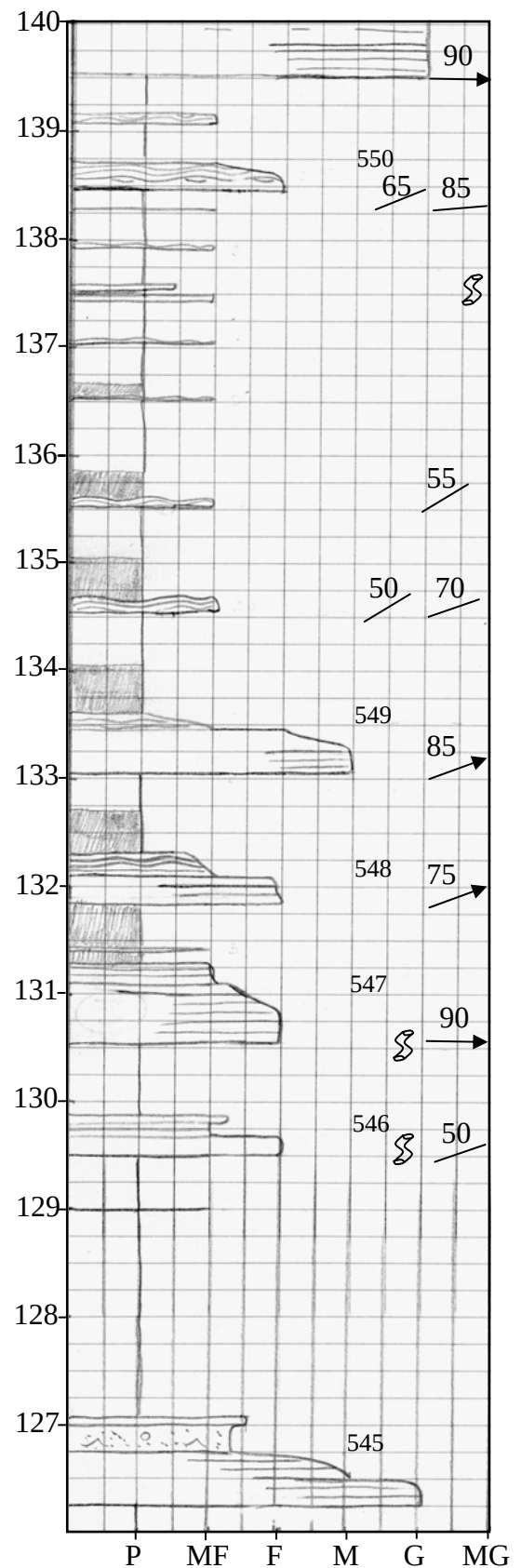
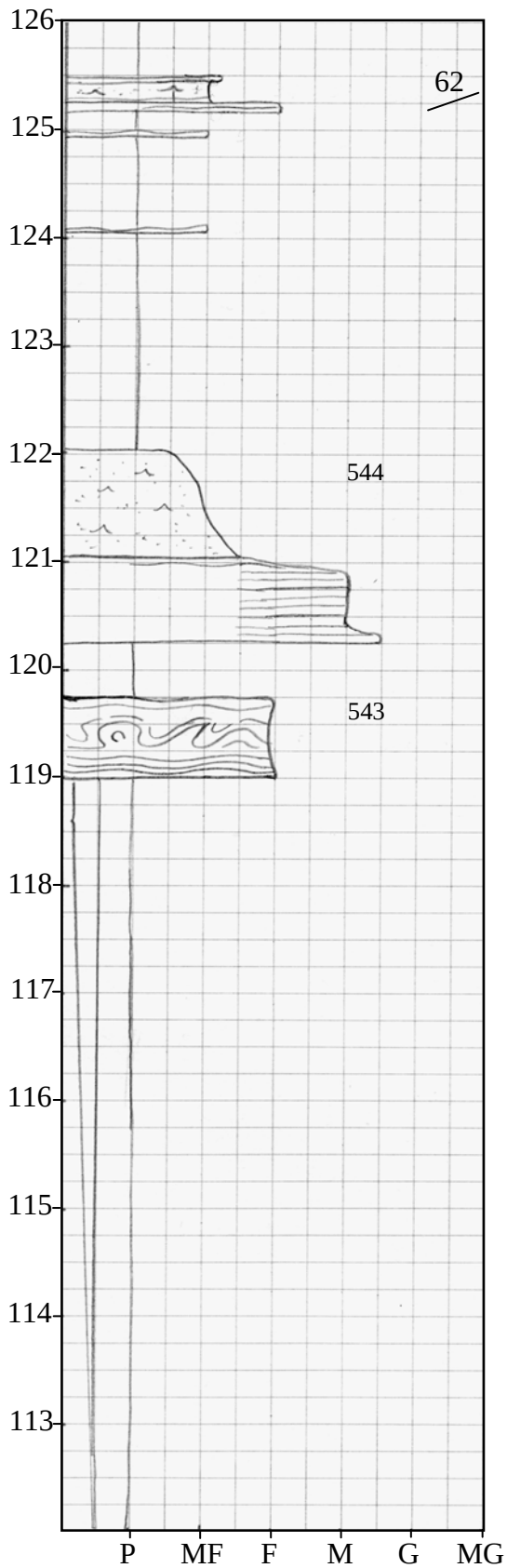
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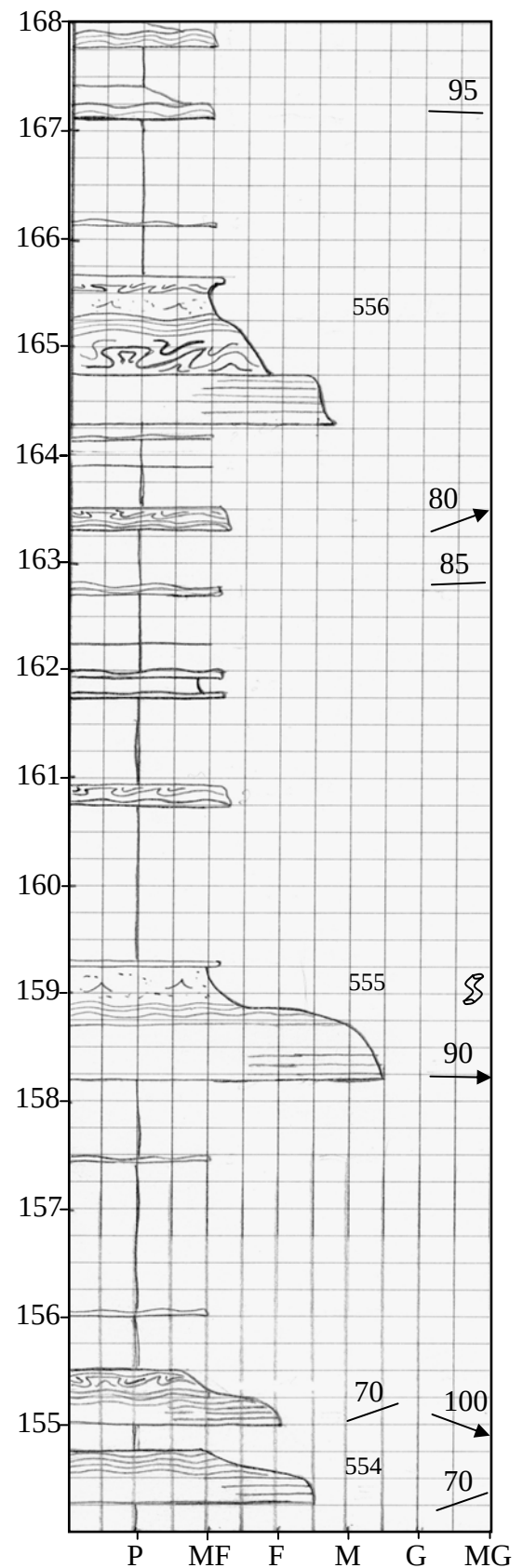
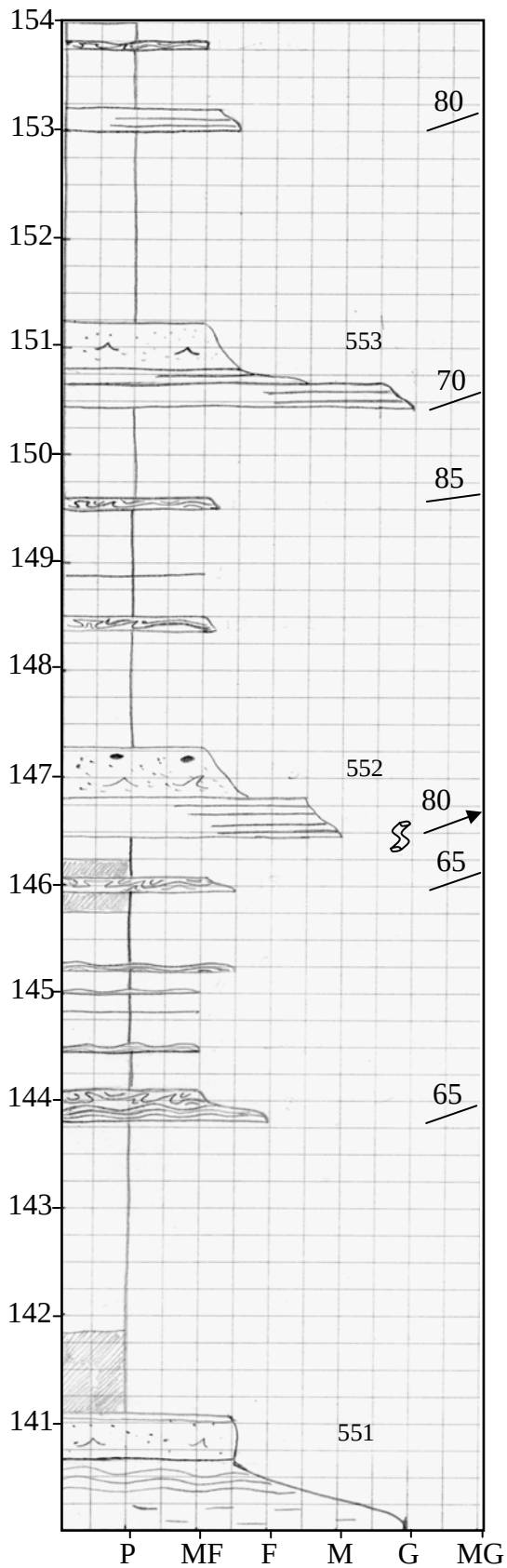
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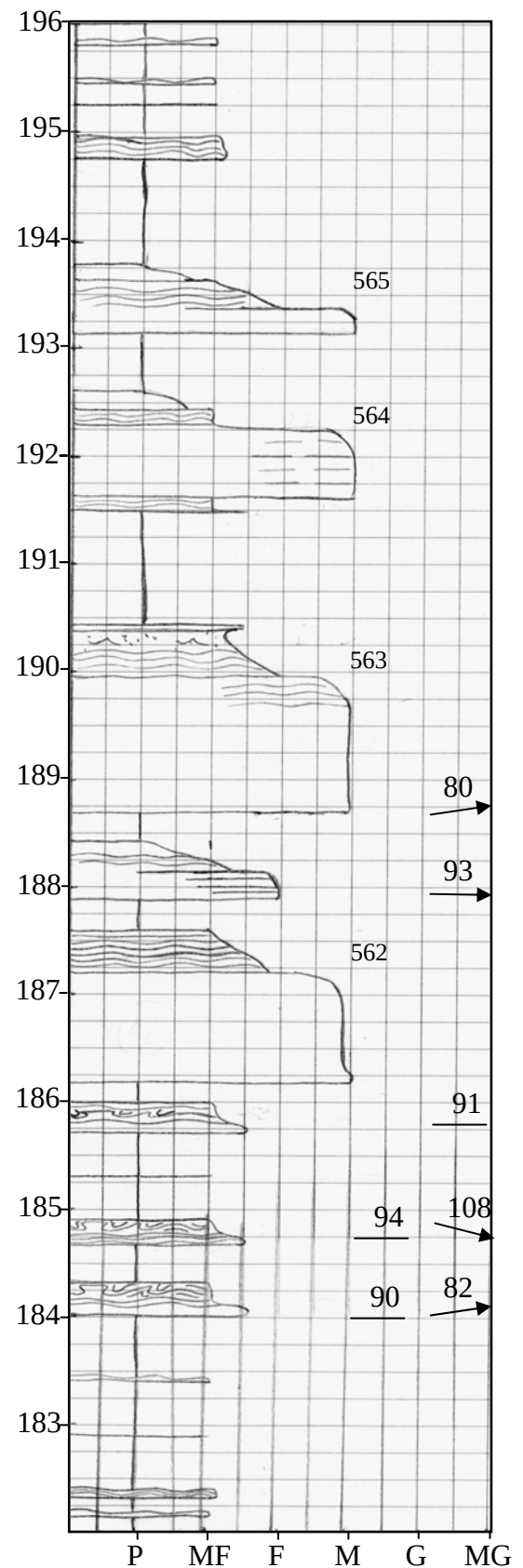
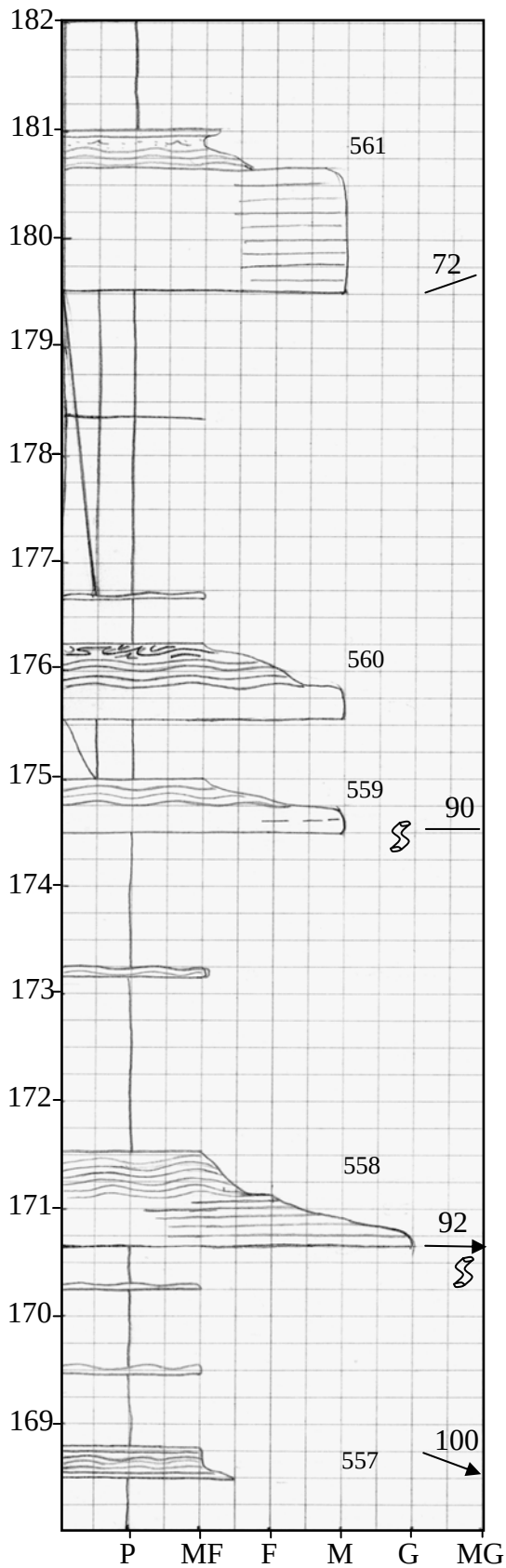
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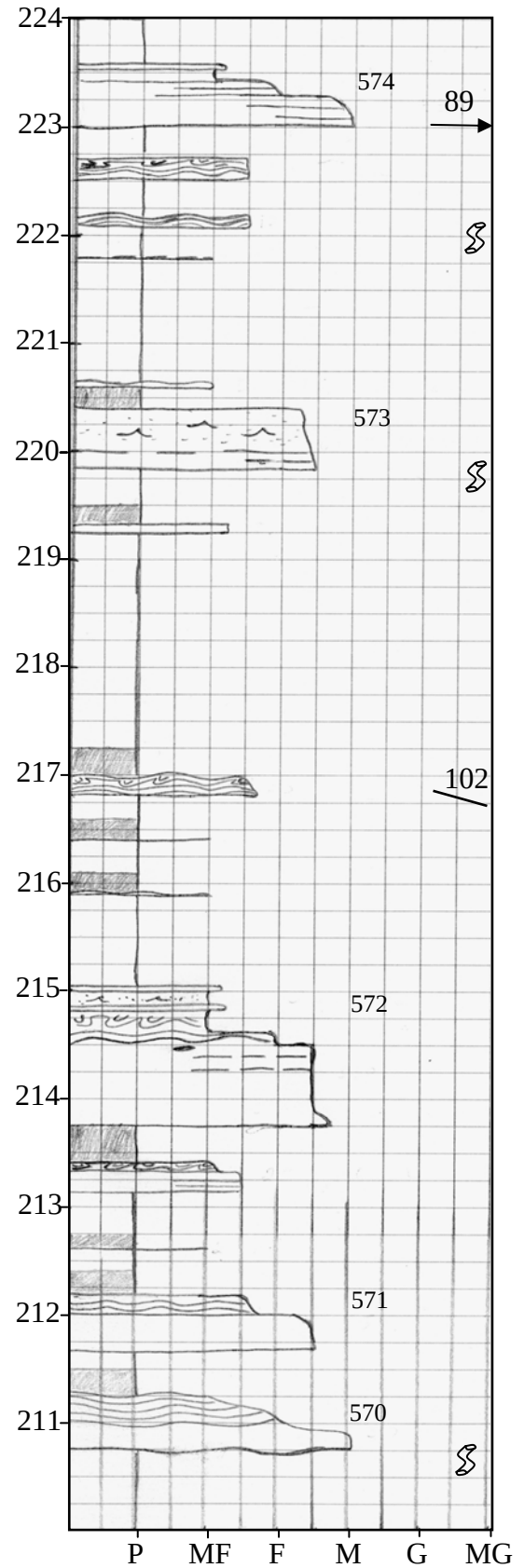
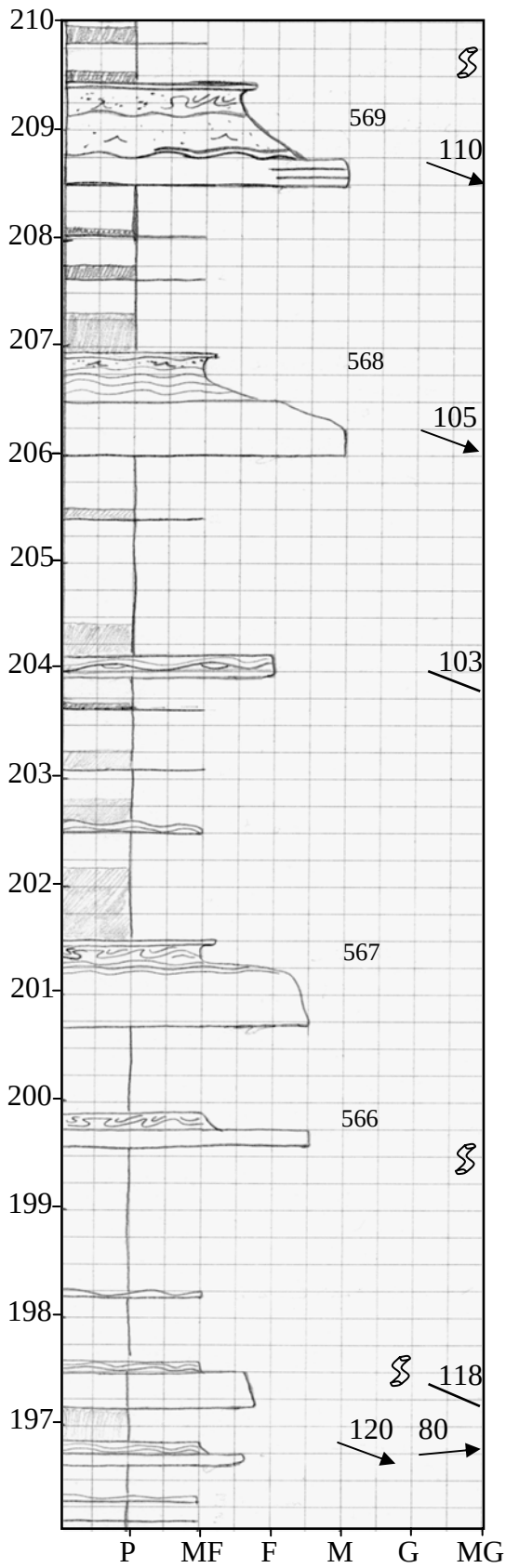
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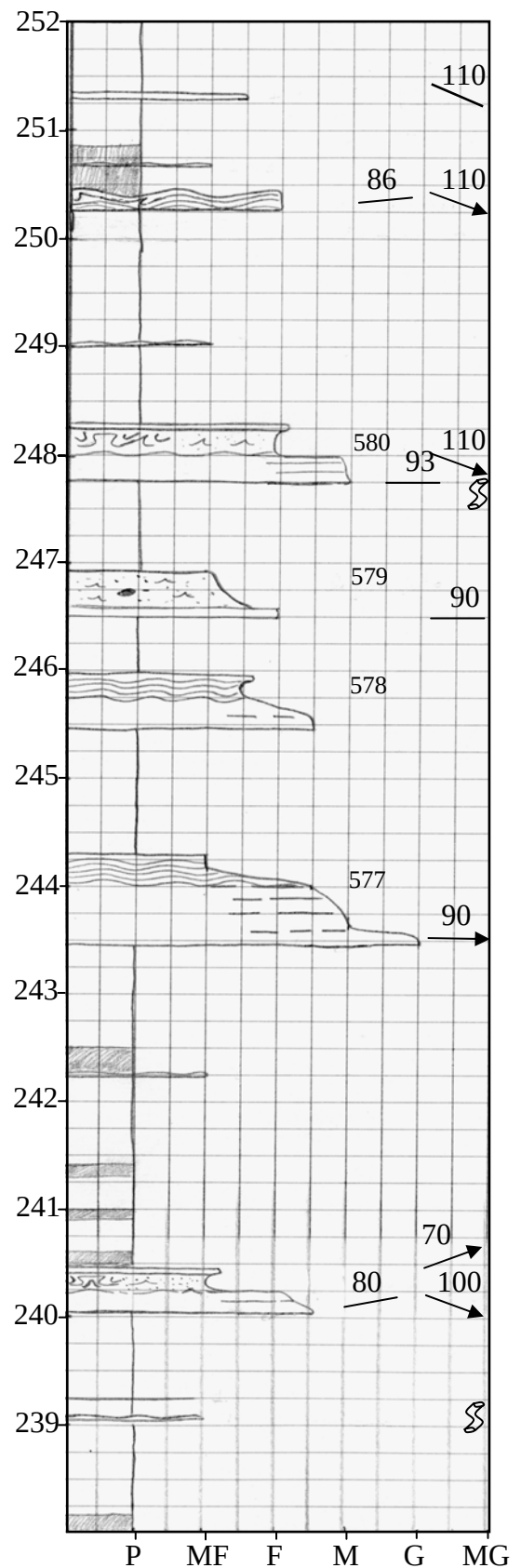
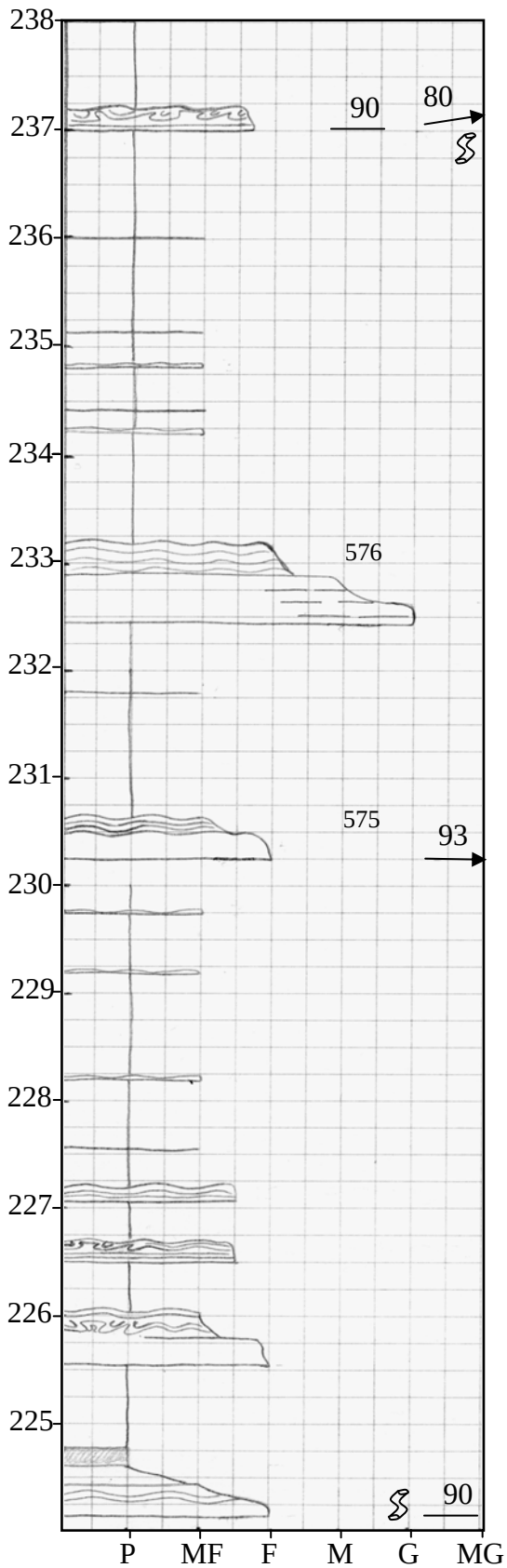
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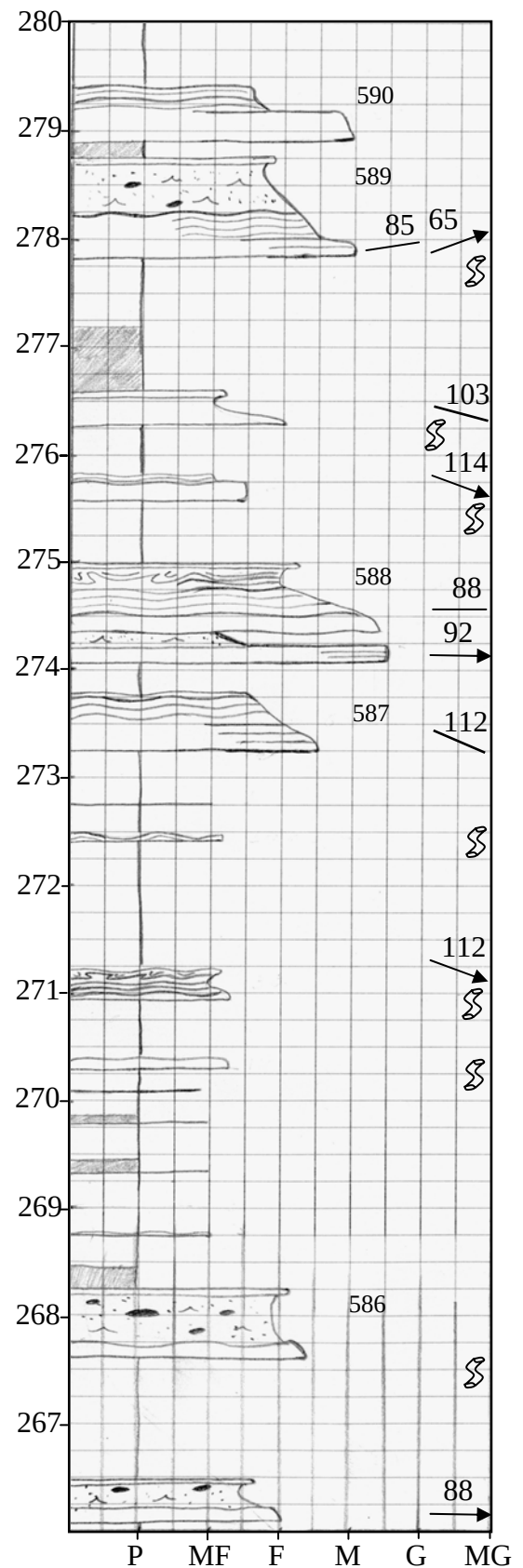
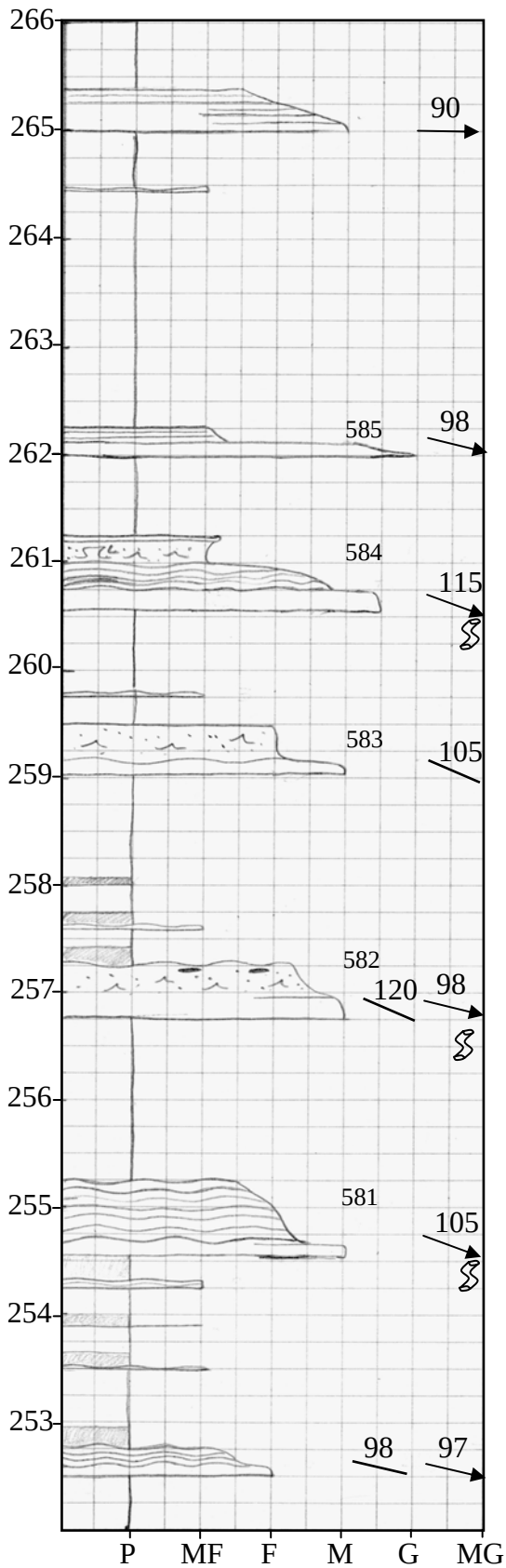
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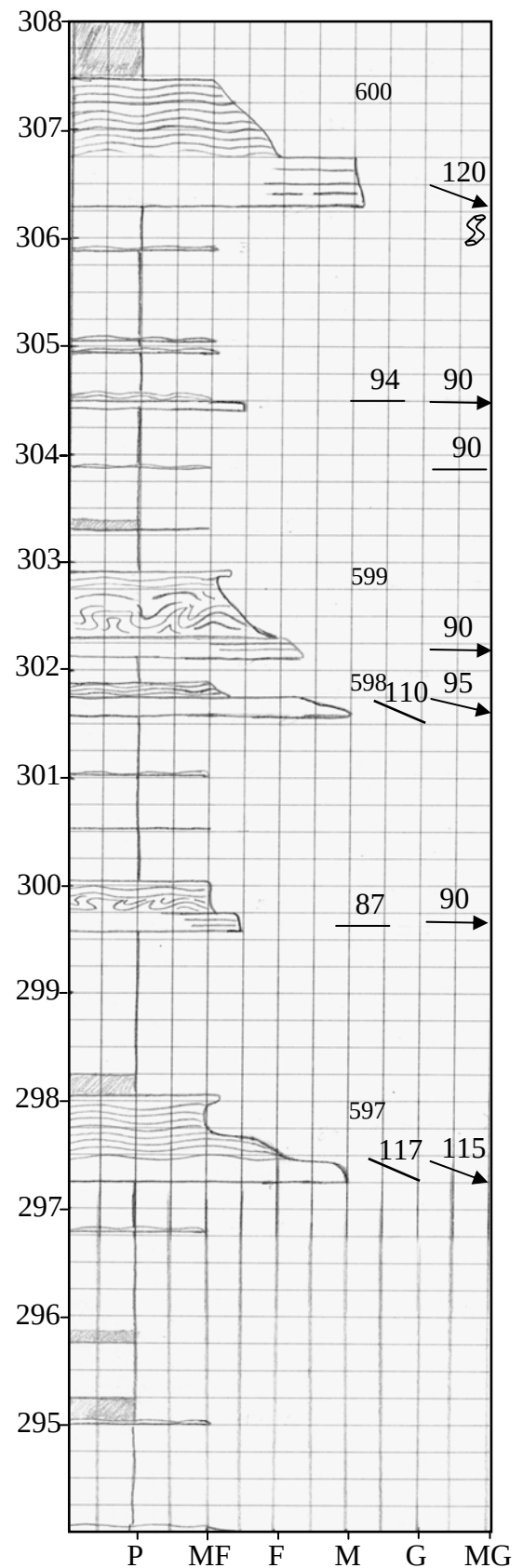
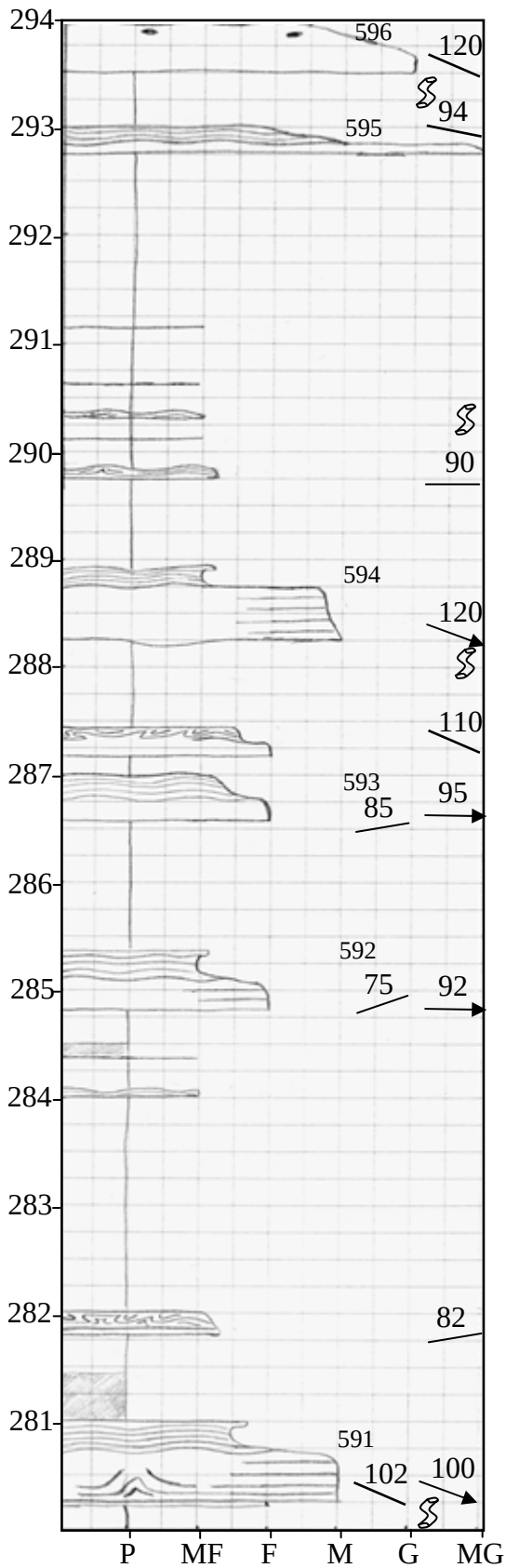
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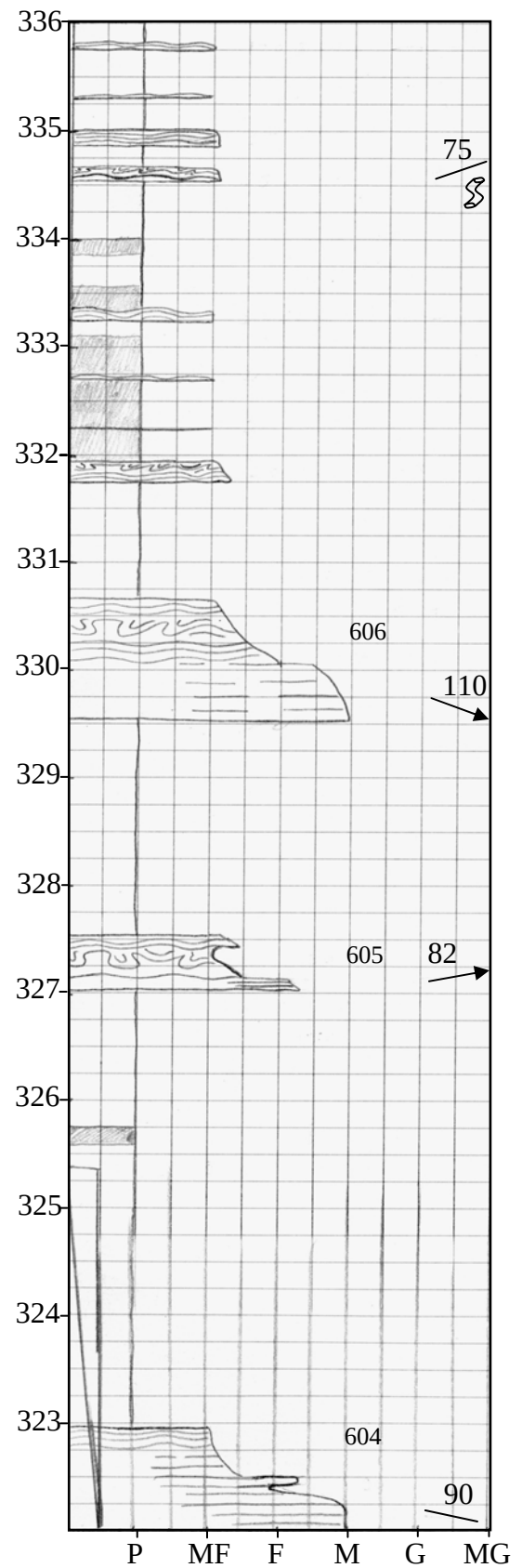
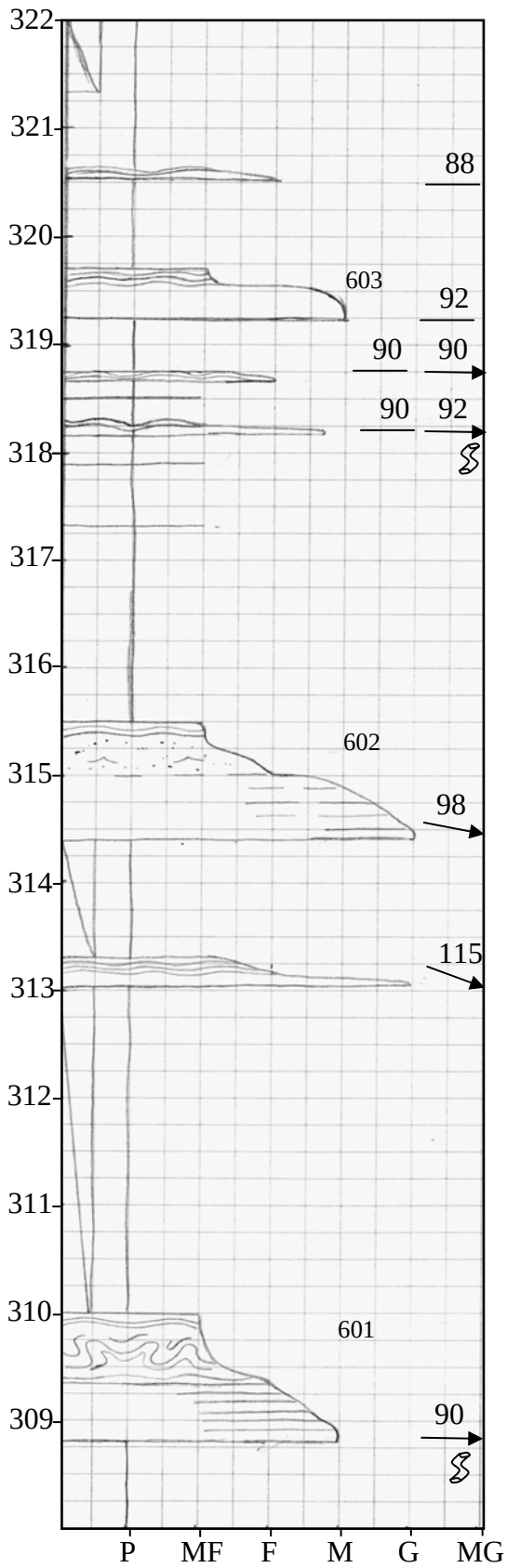
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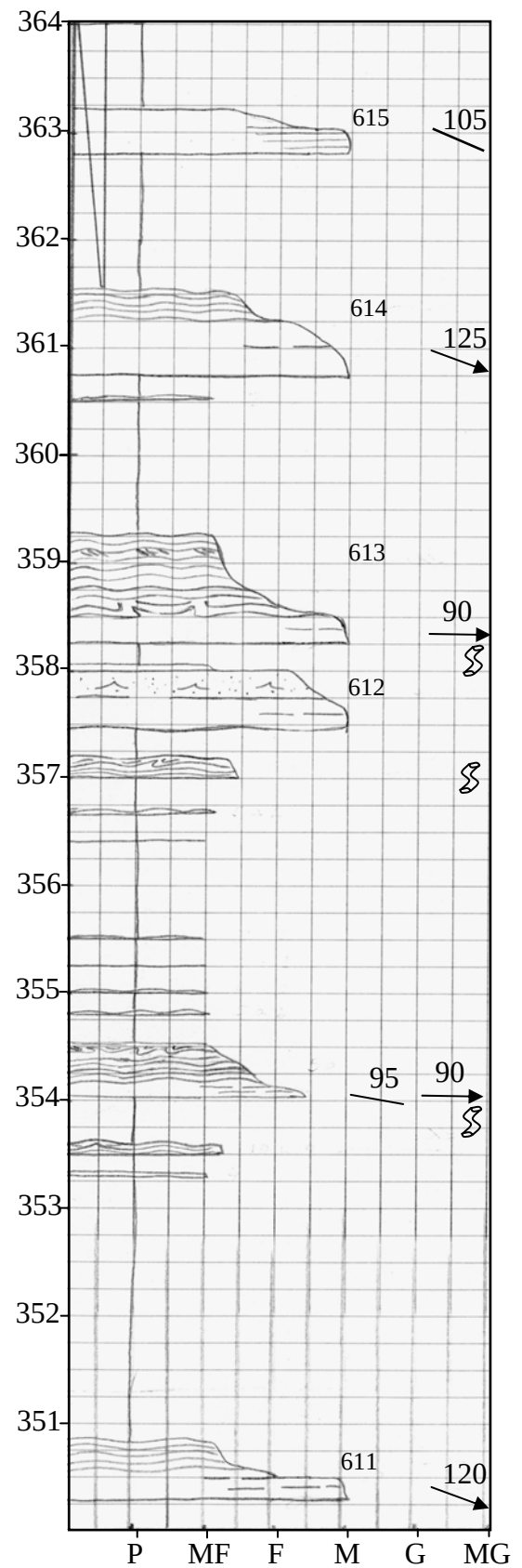
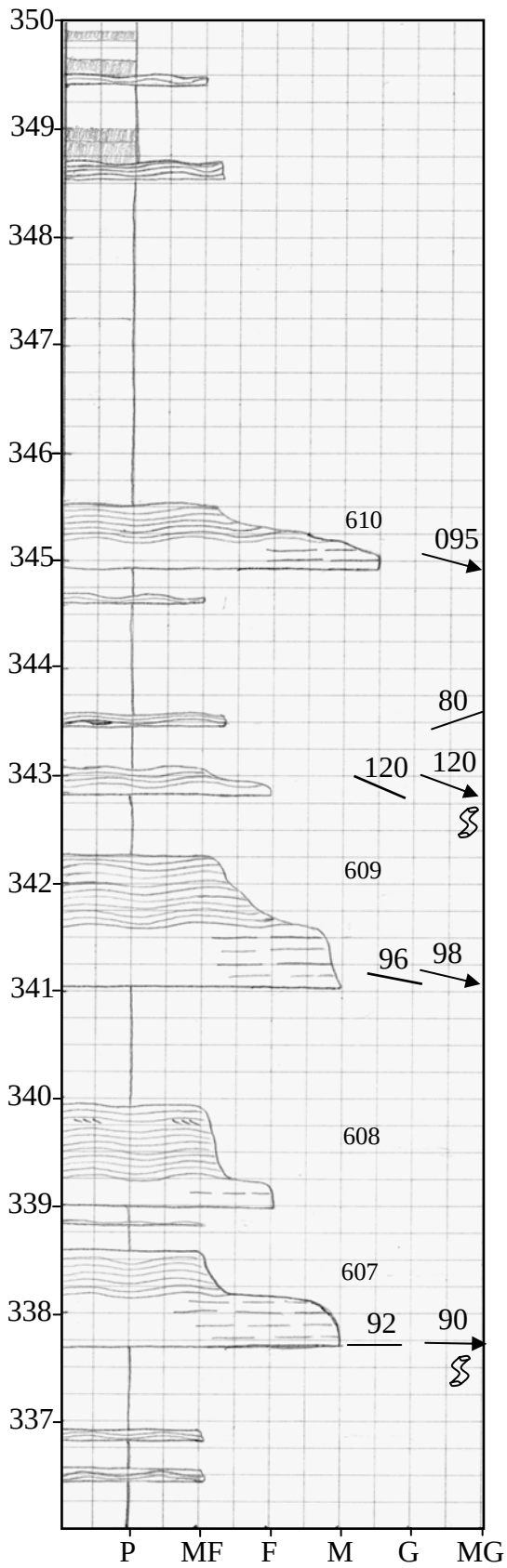
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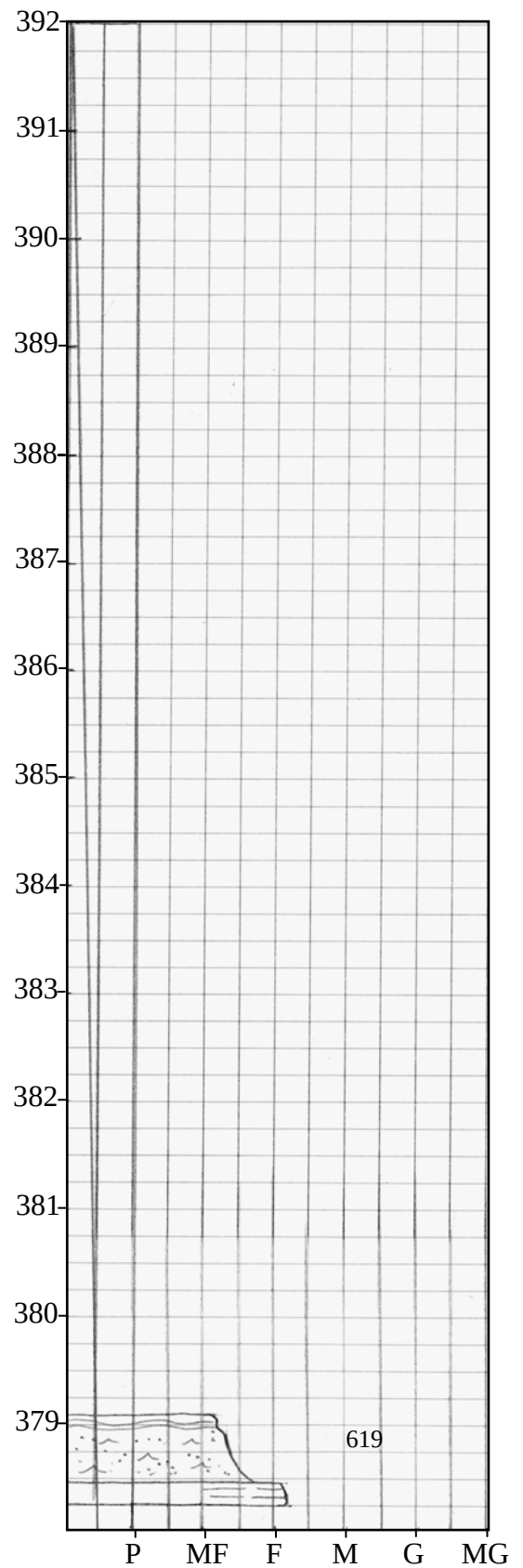
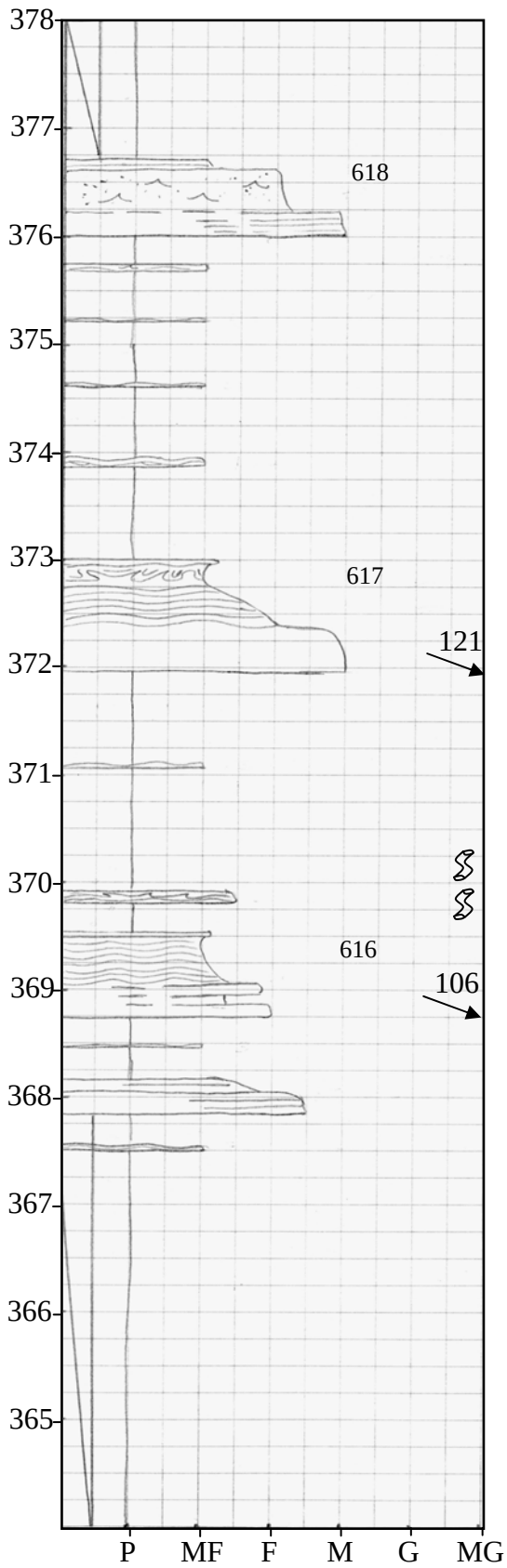
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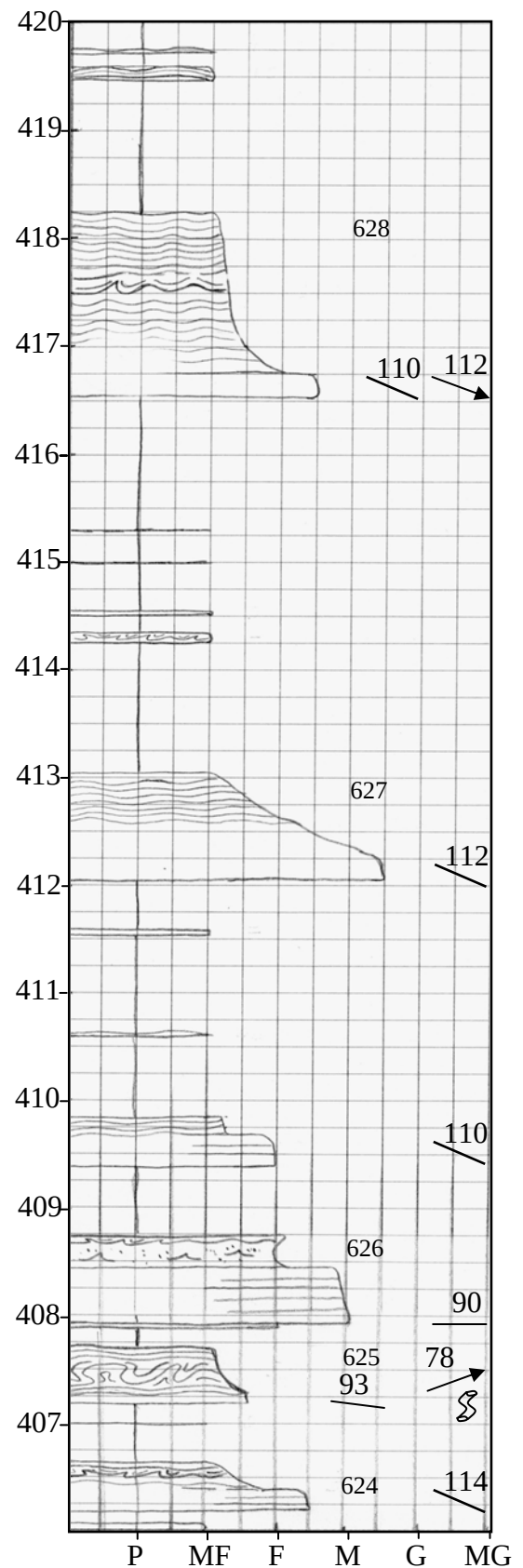
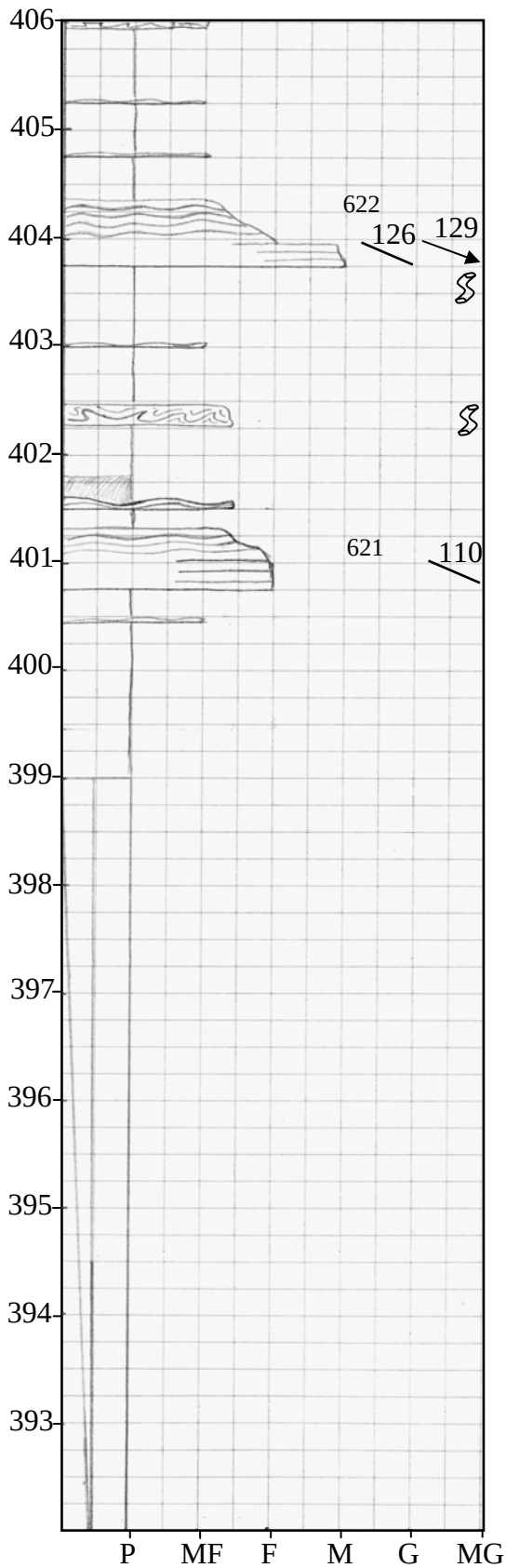
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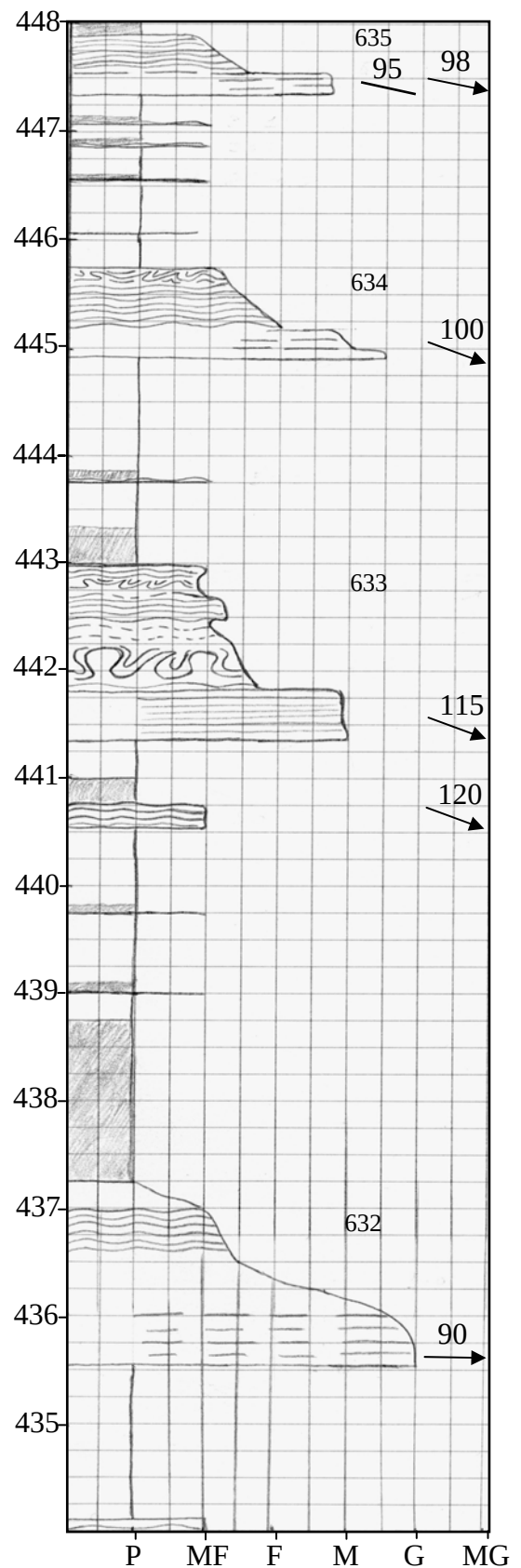
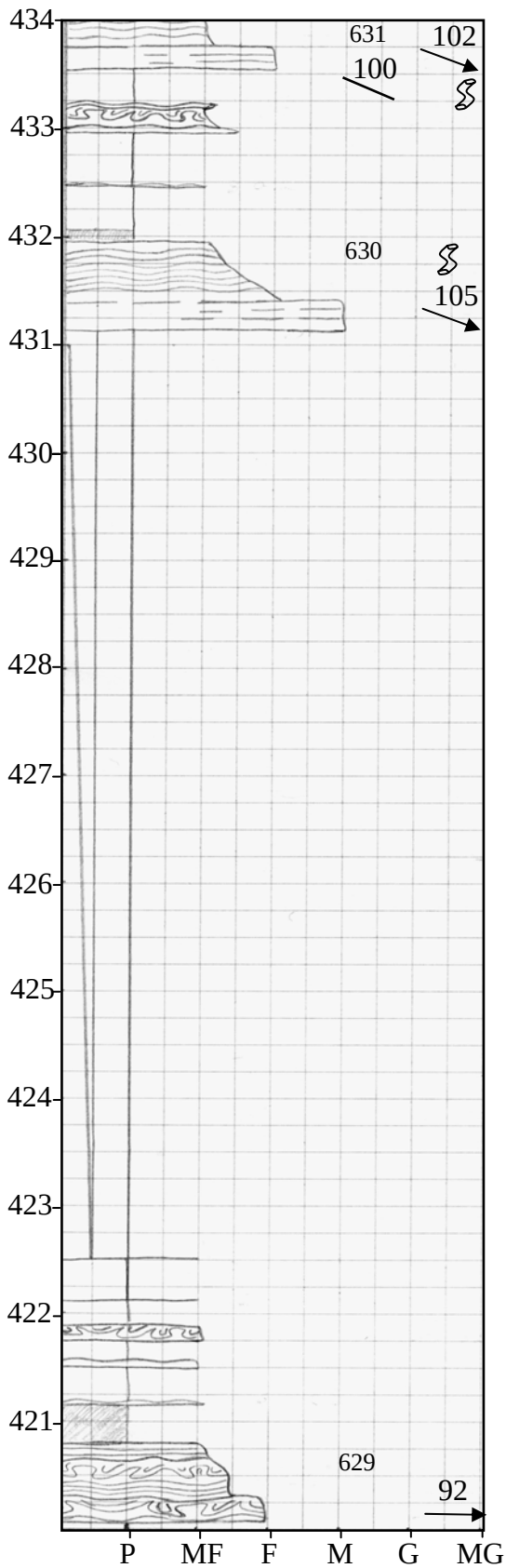
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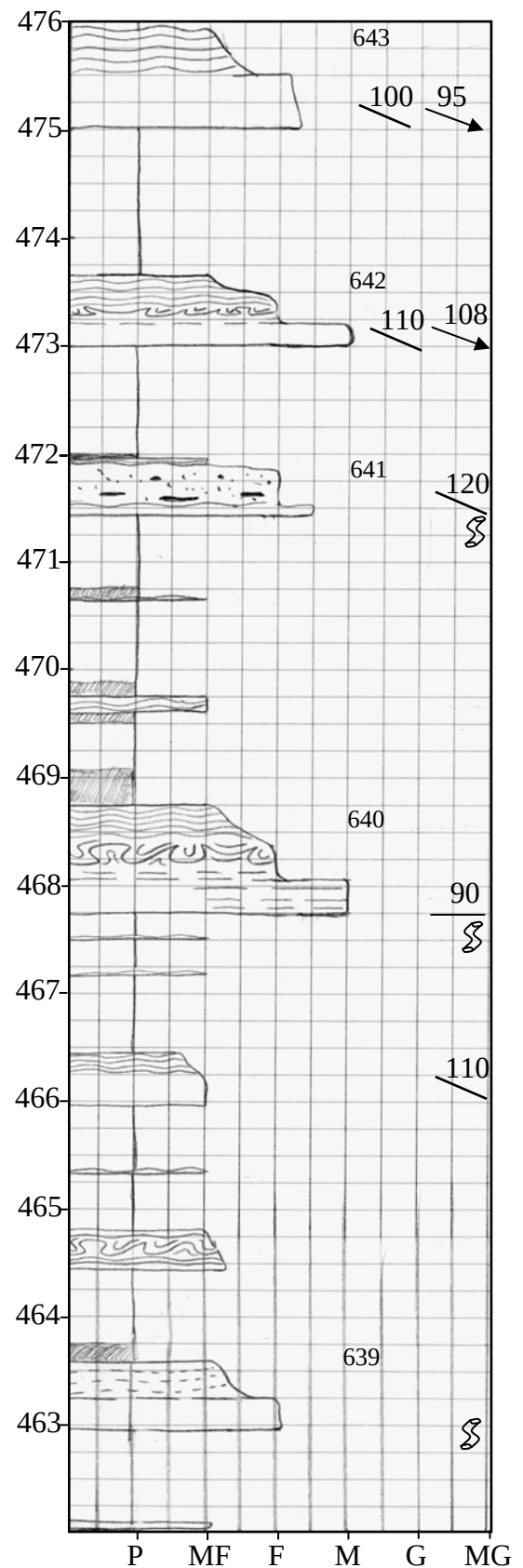
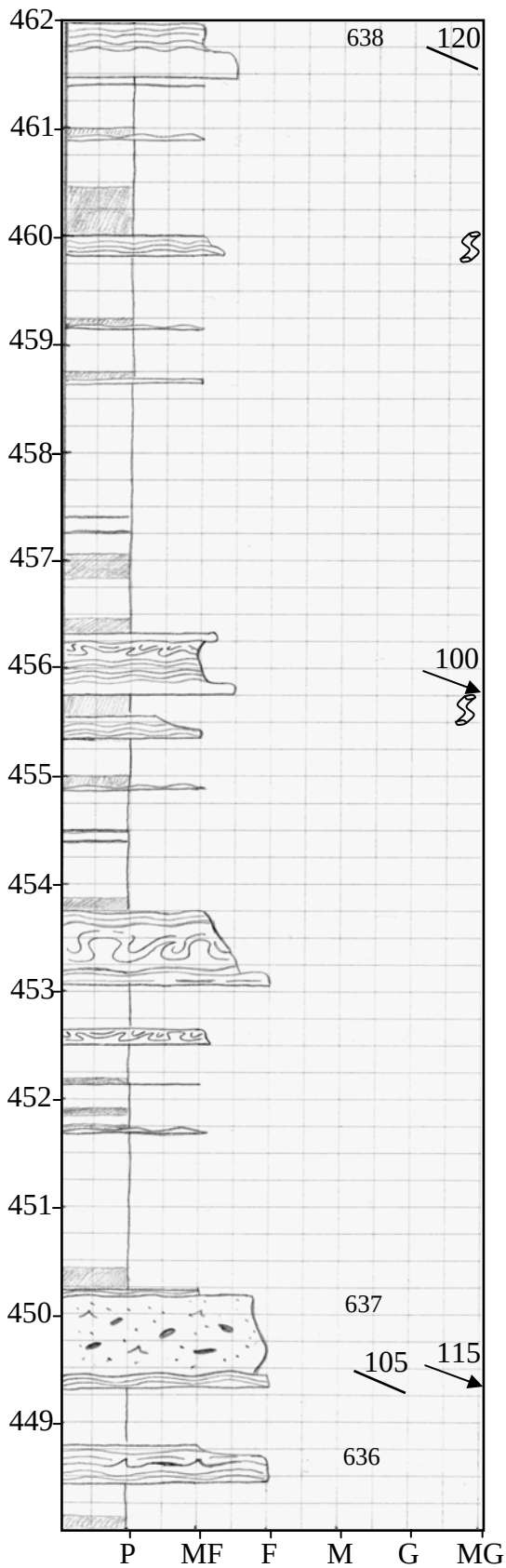
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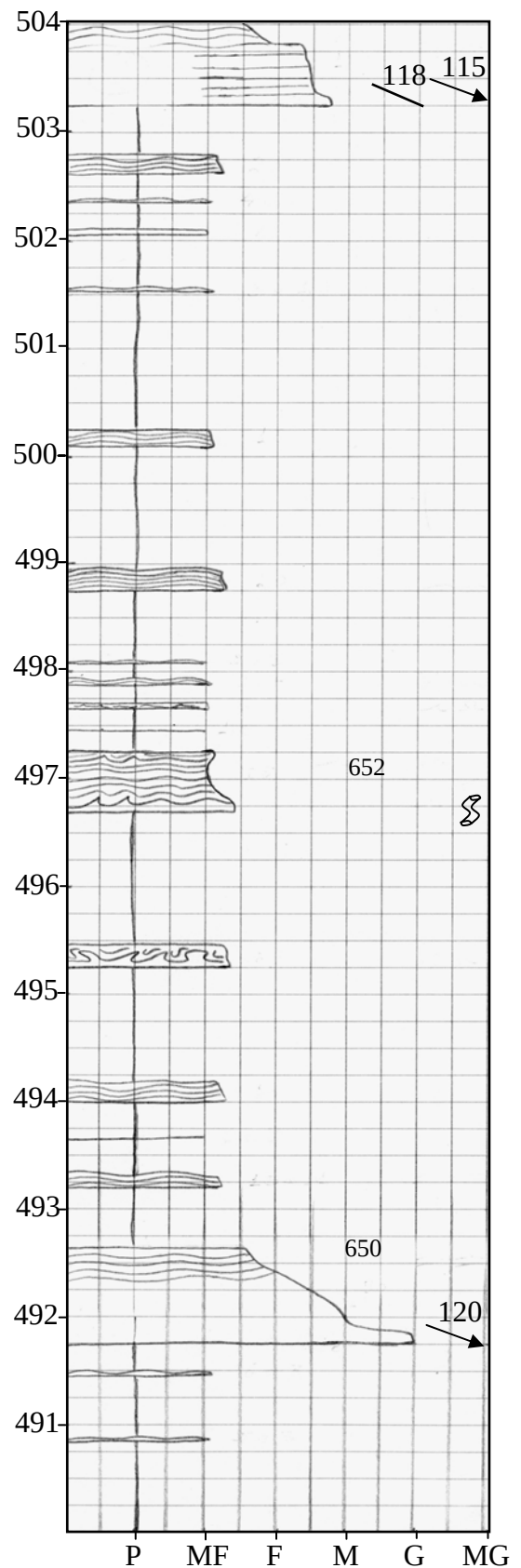
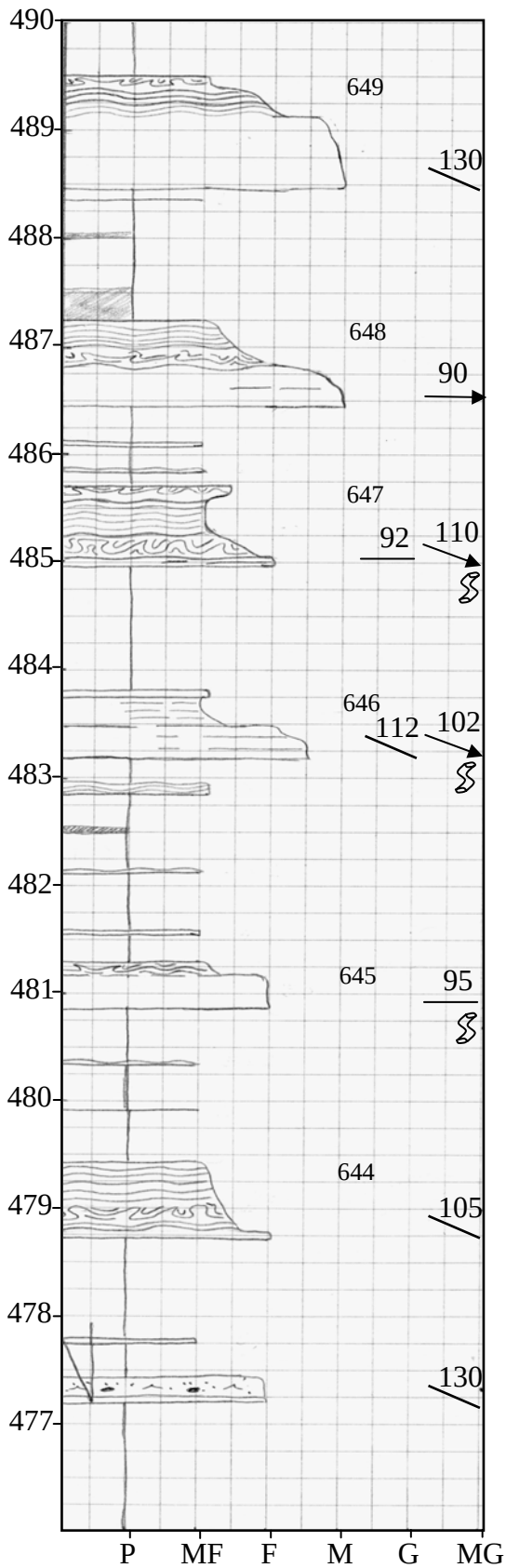
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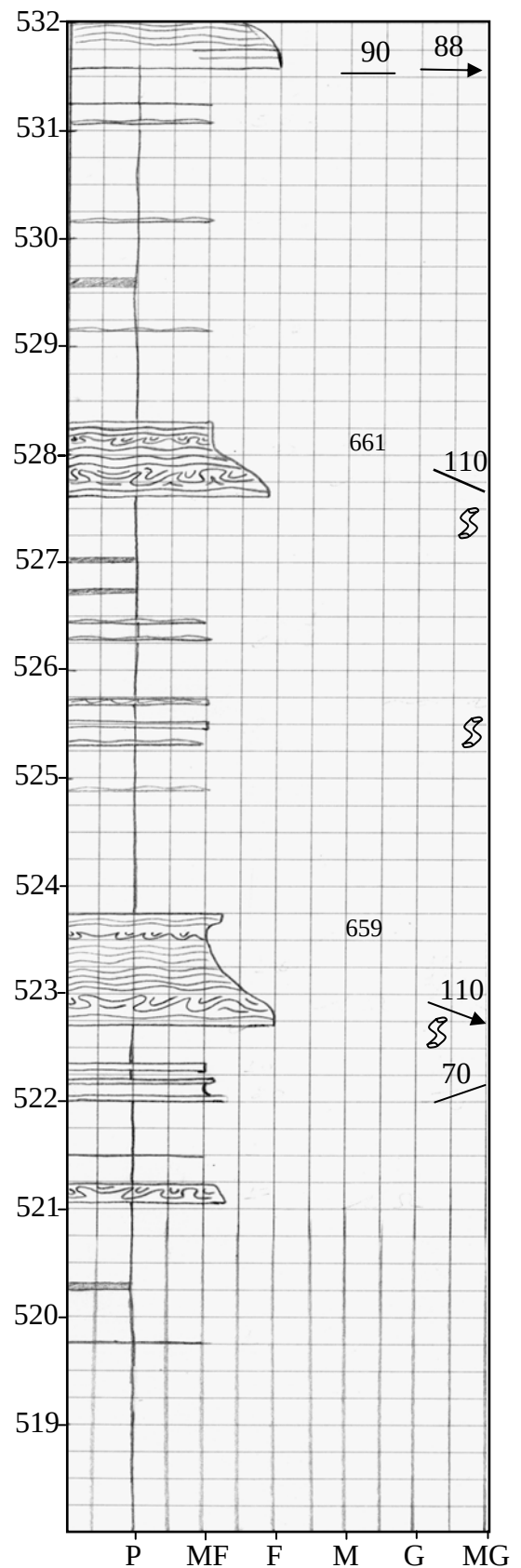
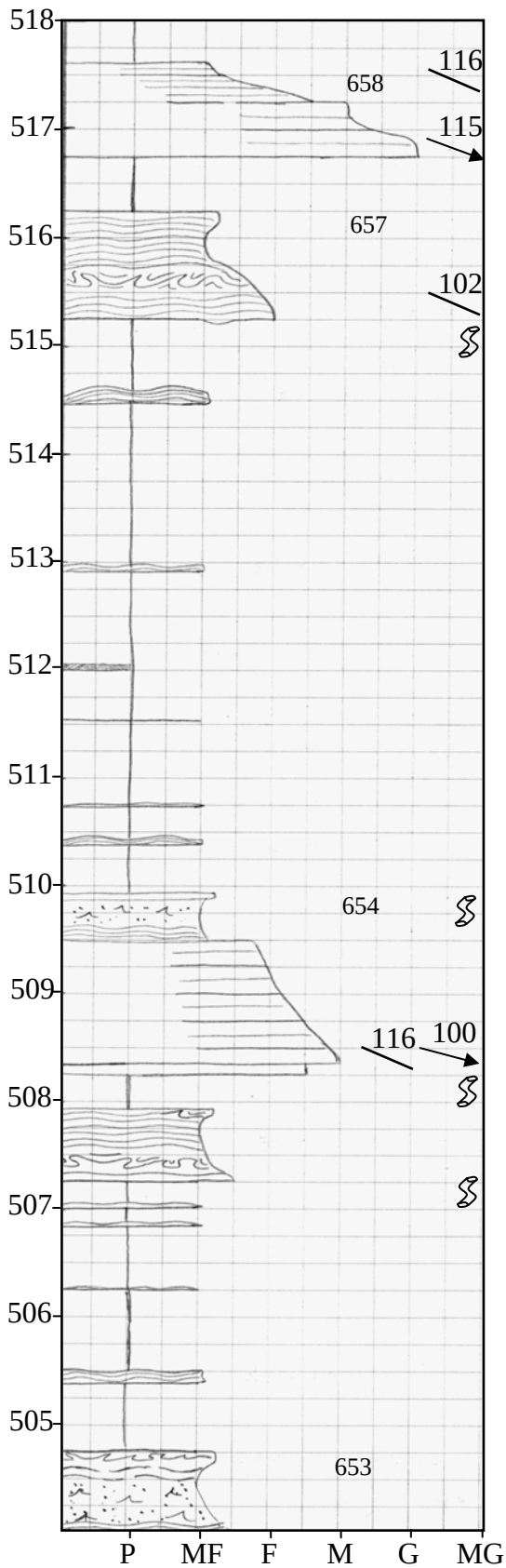
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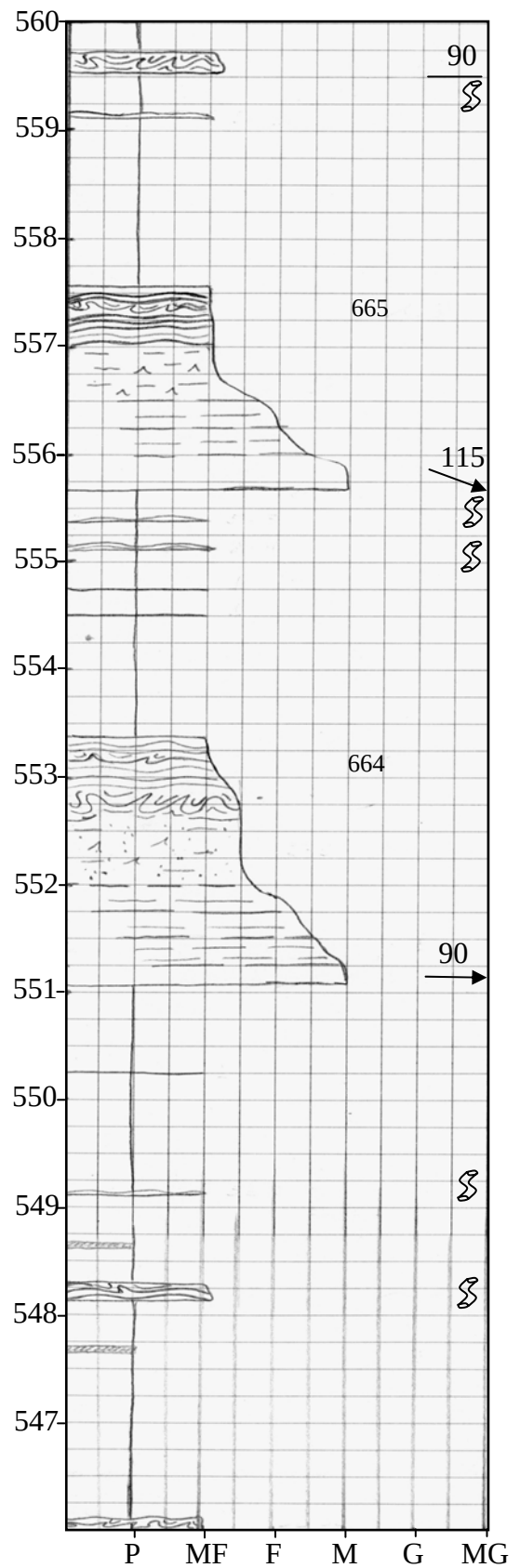
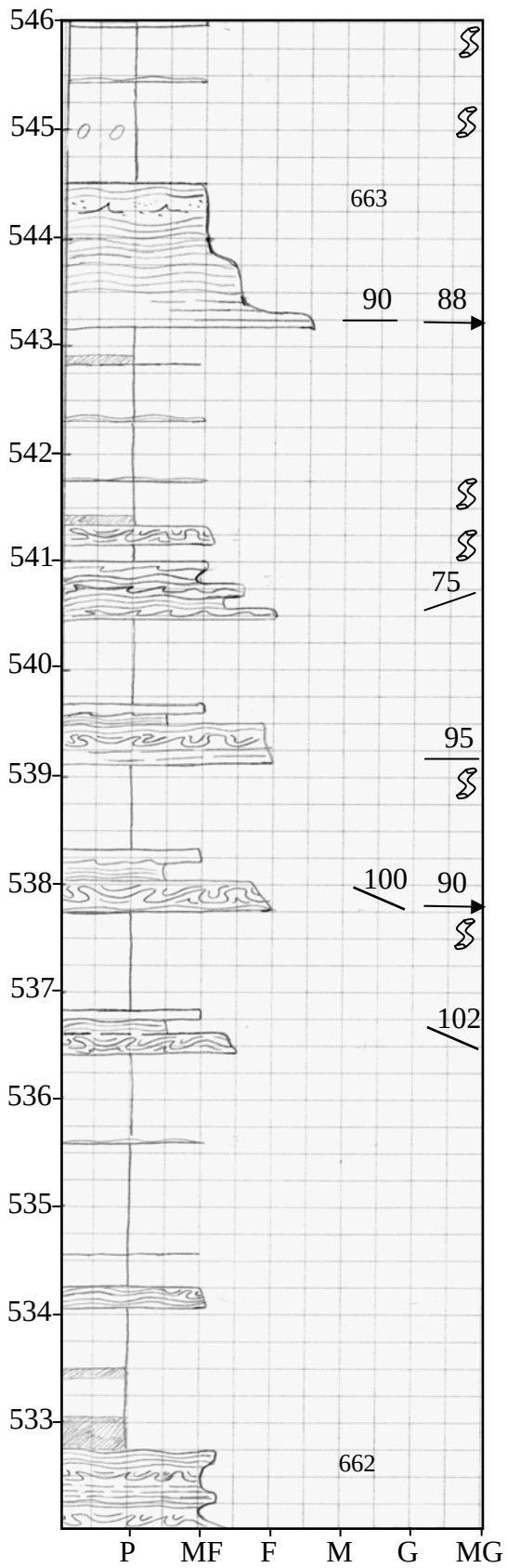
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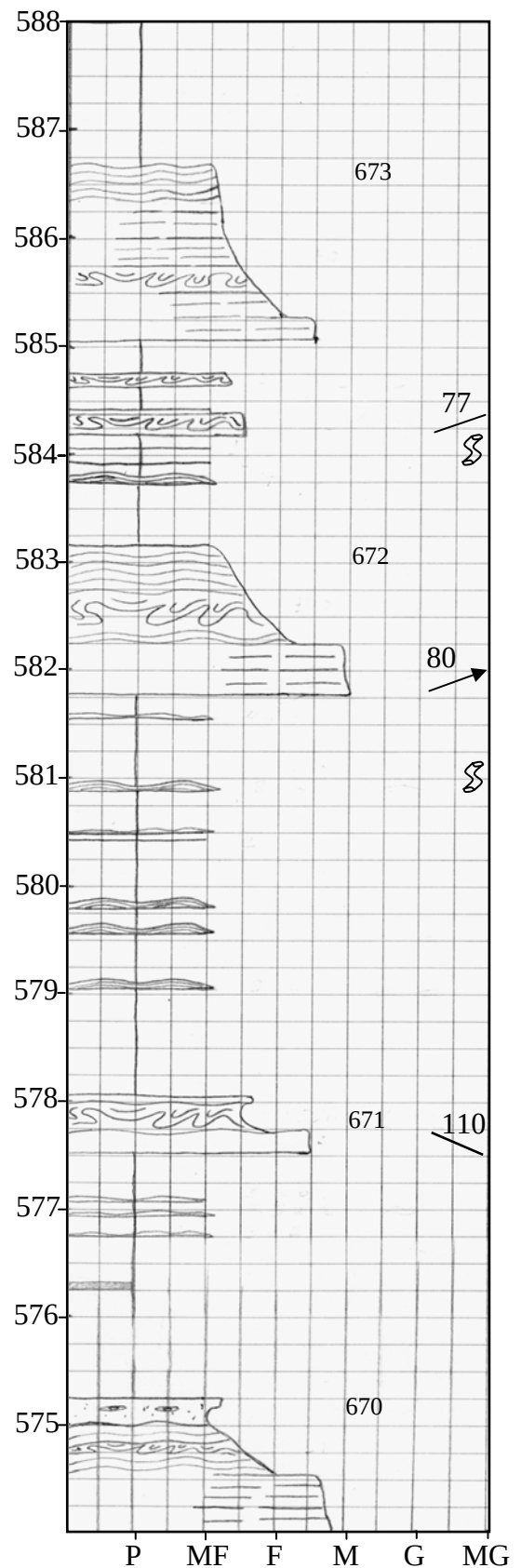
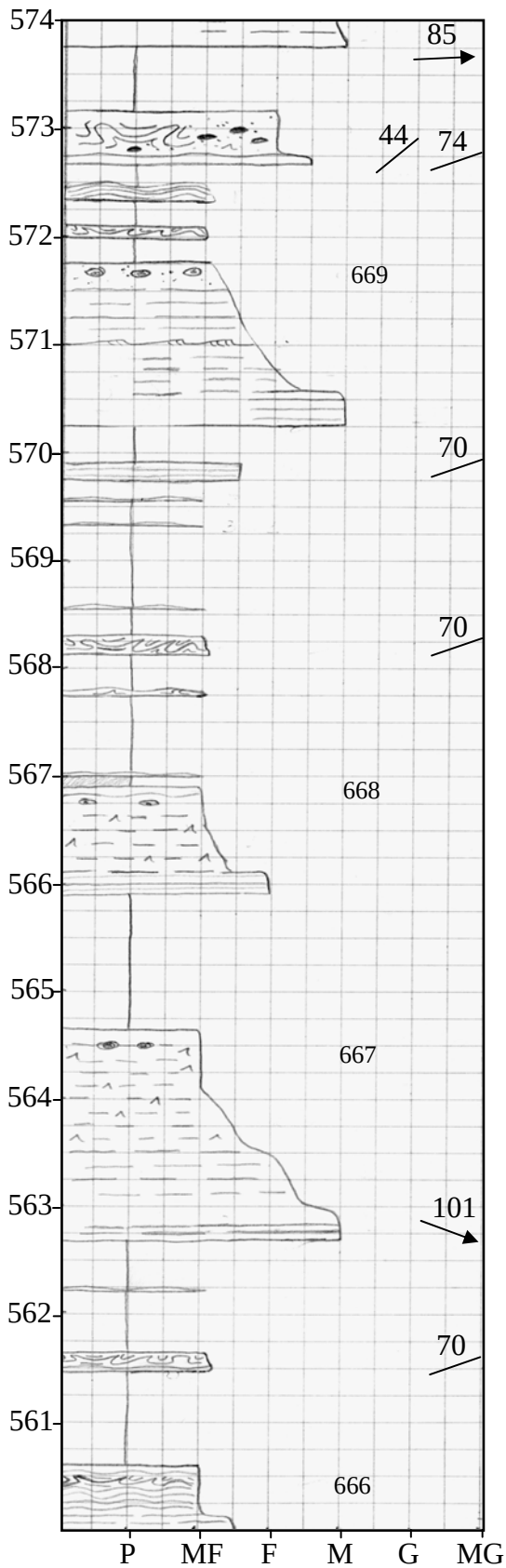
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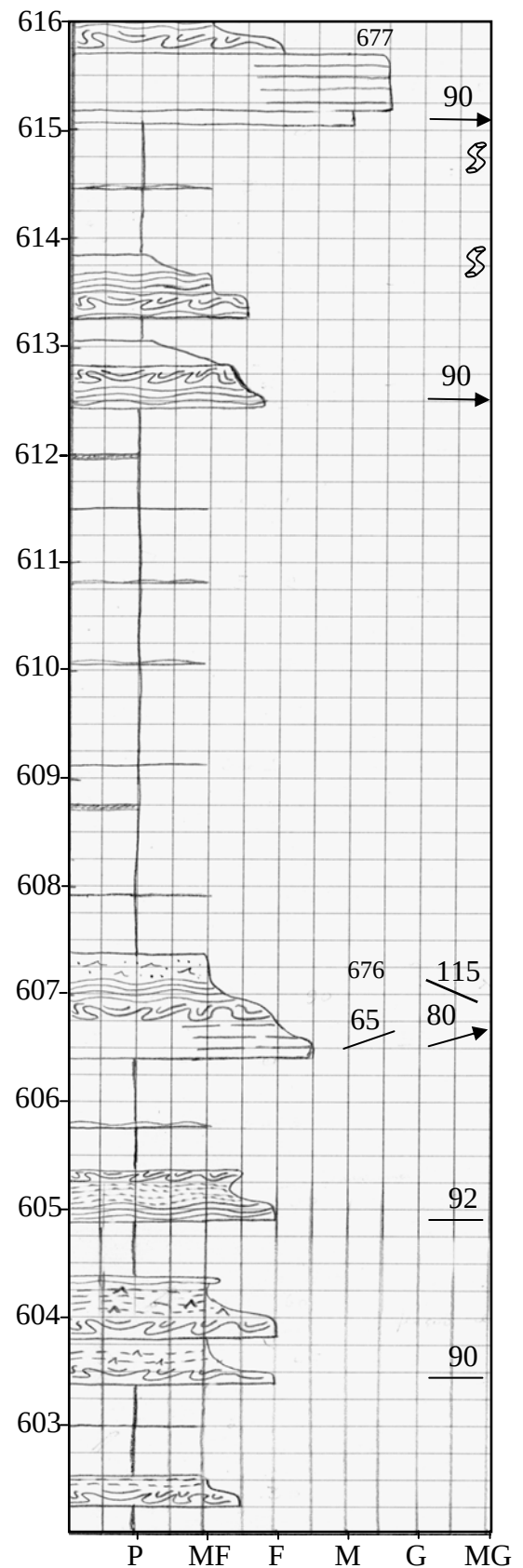
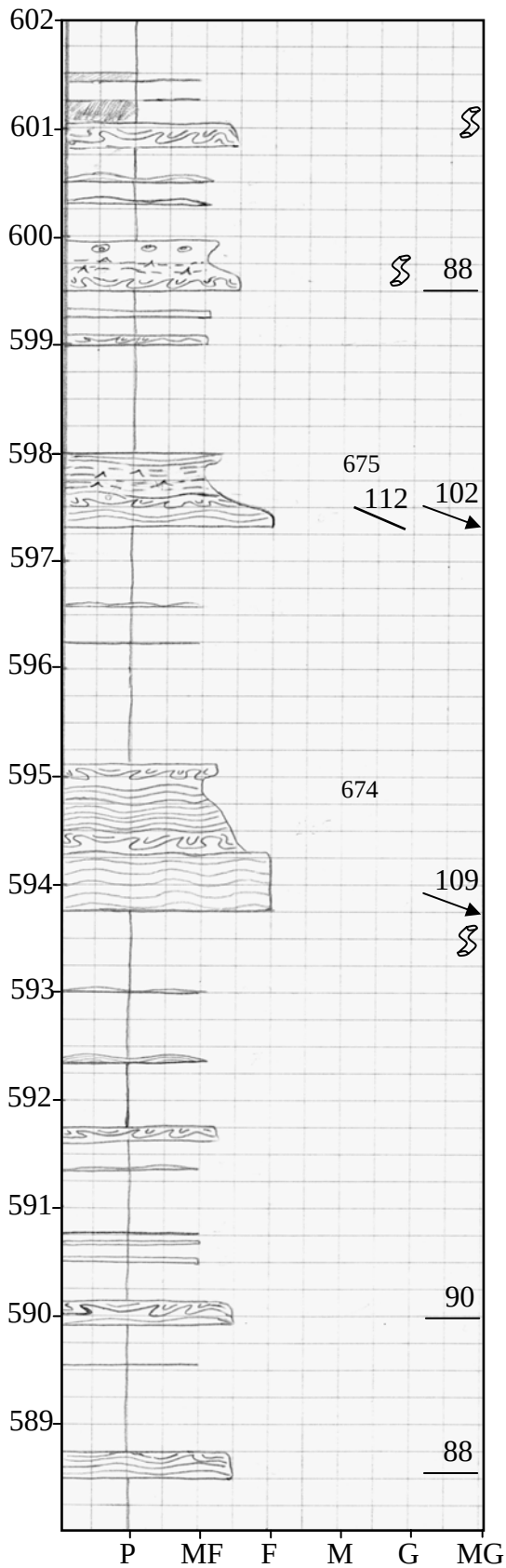
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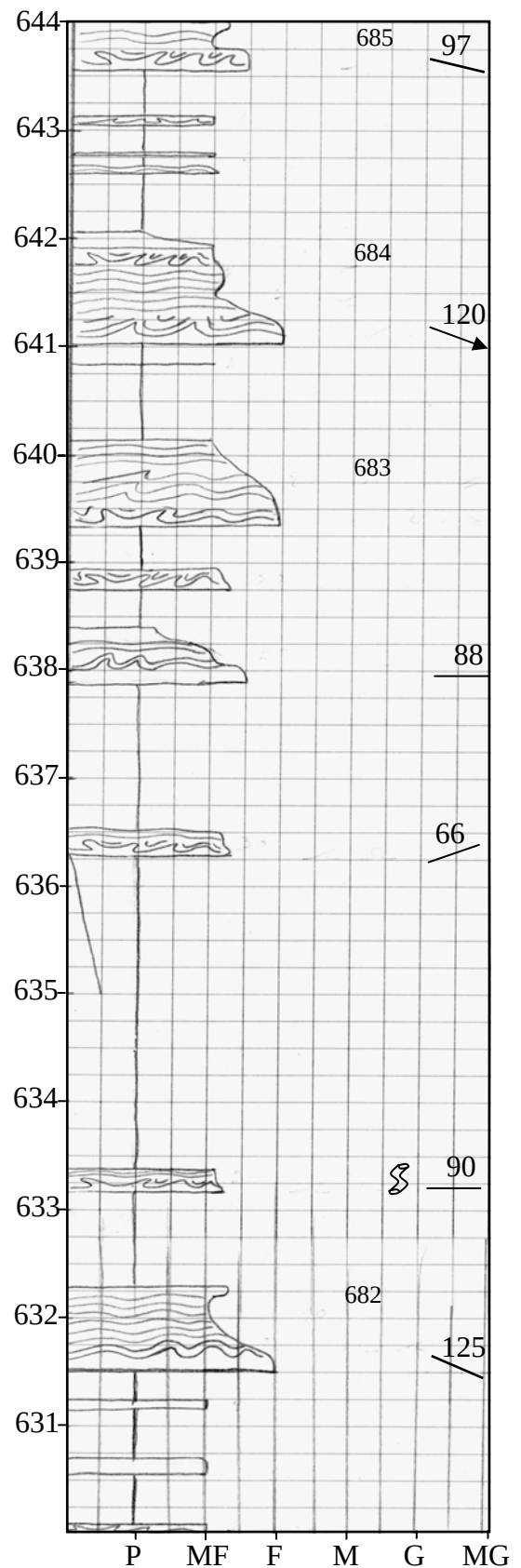
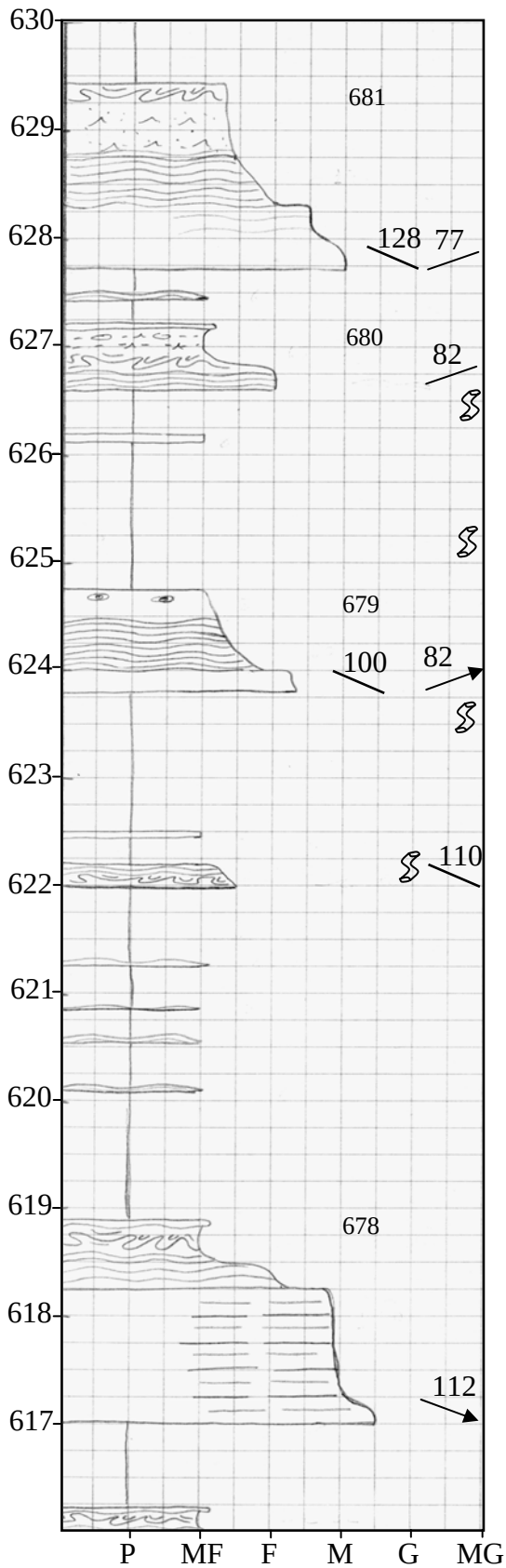
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Sezione G



Sezione G



Sezioni stratigrafiche nel Gruppo di Hecho (Pirenei centro meridionali, Spagna)

Durante il periodo di dottorato sono stati misurati, anche 304 m all'interno del sistema torbiditico di Coteflabo (Eocene Medio, Gruppo di Hecho, Perinei centro-meridionale, Spagna; per più informazioni relative a questo sistema torbiditico vedasi Mutti *et al.*, 1985, 1988). Questa unità, comunque, è stata denominata anche Allogruppo del Banaston 1 da Remacha & Fernandez, (2003) e Remacha *et al.* (2005).

Lo scopo principale di questo lavoro è stato quello di ottenere dei dati relativi ad un'altro *basin plain* rispetto a quello della FMA per fare poi un paragone tra i due tipi di deposito. Secondo Remacha & Fernandez (2003) e Remacha *et al.* (2005) gli strati dell'Allogruppo del Banaston 1 sono caratterizzati da un'aumento relativo degli strati più spessi sottocorrente, fra la regione dei lobi e della piana bacinale. Gli autori, riprendendo il lavoro di Pickering & Hiscott (1985), hanno proposto uno schema di facies ideale per gli strati di *basin plain* (vedasi Volume I). Il modello propone due sequenze di facies, una basata sulle osservazioni di terreno e una ideale. Secondo questa interpretazione le sequenze di facies ideali sarebbero originariamente formate da una parte basale arenacea relativamente spessa, deposta da un flusso primario, che passa verso l'alto ad una unità sommitale pelitica attraverso una zona intermedia composta da diversi strati sottili che sarebbero legati ai vari fenomeni di *ponding*. Le sequenze di facies degli strati di *basin plain* che si osservano sul terreno, invece, mostrano, generalmente, delle caratteristiche diverse. In questi strati la parte intermedia si presenta come una arenite fine e/o siltite fangosa mal classata con un'aspetto liquefatto in cui sono riconoscibili piccoli pseudonoduli e microframmenti di peliti contorte. Remacha *et al.* (2005), seguendo le orme del lavoro di Pickering & Hiscott (1985), interpretano questa unità a pseudonoduli come legata a fenomeni di fluidificazione associati al *cyclic wave loading* dovuto al processo di *ponding*.

Data l'importanza del problema sono state misurate due sezioni stratigrafiche (vedasi capitolo 6.1, Volume I). La prima, con 245 m di spessore, è ubicata nei pressi del bivio tra Ansò e Fago, ad ovest del paese di Ansò (Fig. 10). L'altra sezione, invece, con 54 m di spessore, è localizzata lungo la strada che porta al Paese di Aragüés del Puerto a circa 4 Km a sud del paese (Fig. 10).

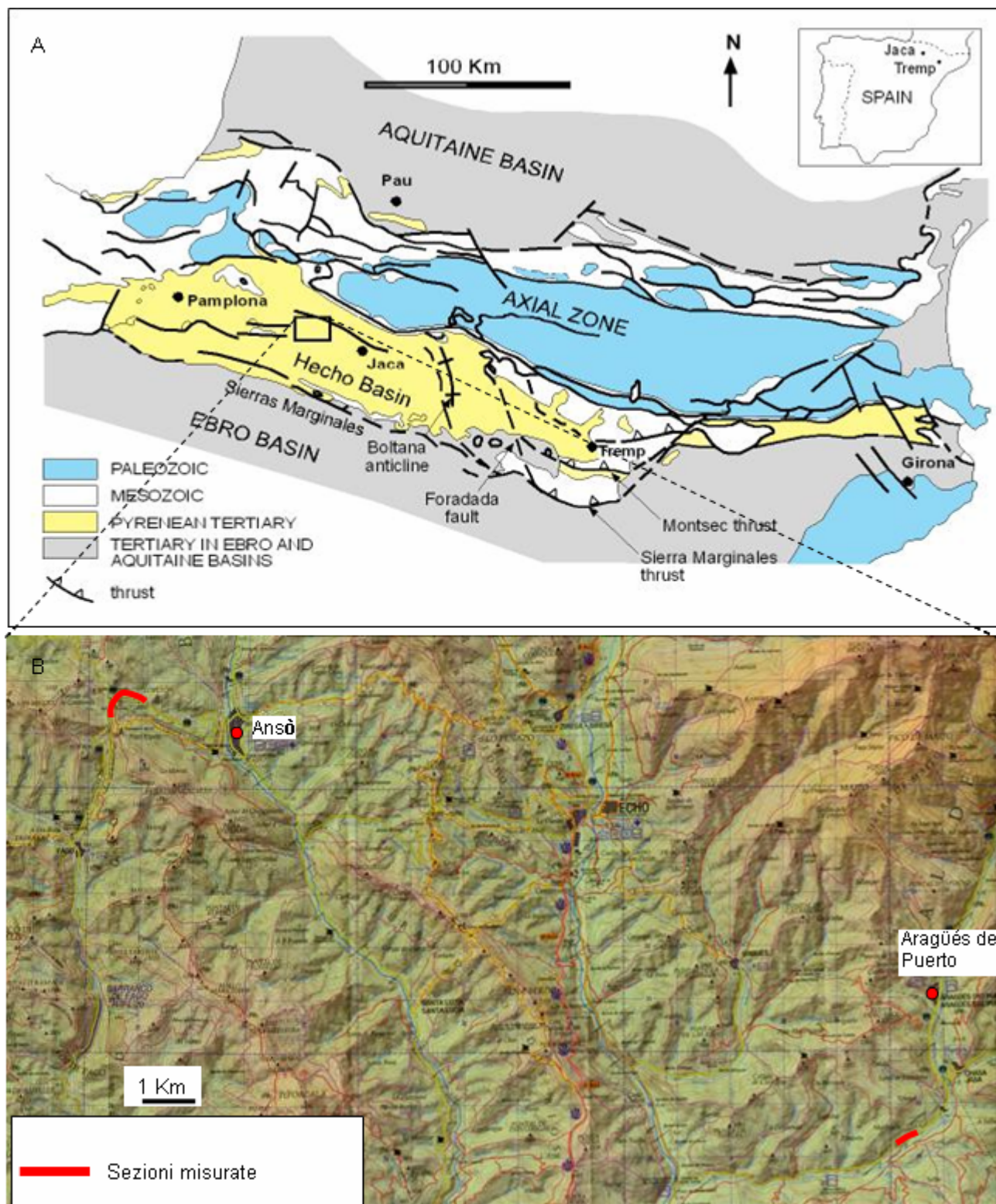
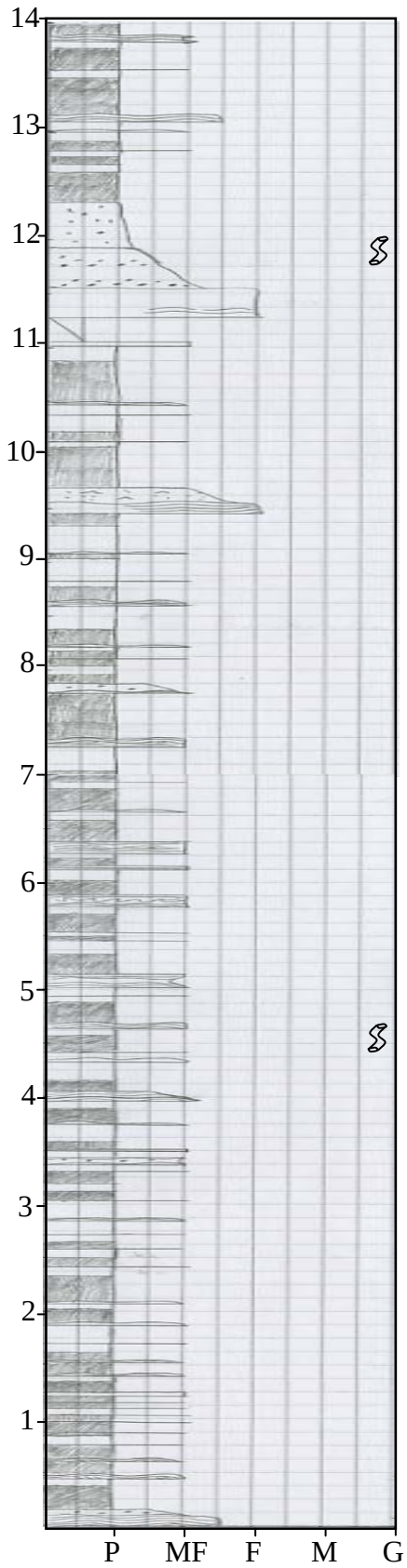
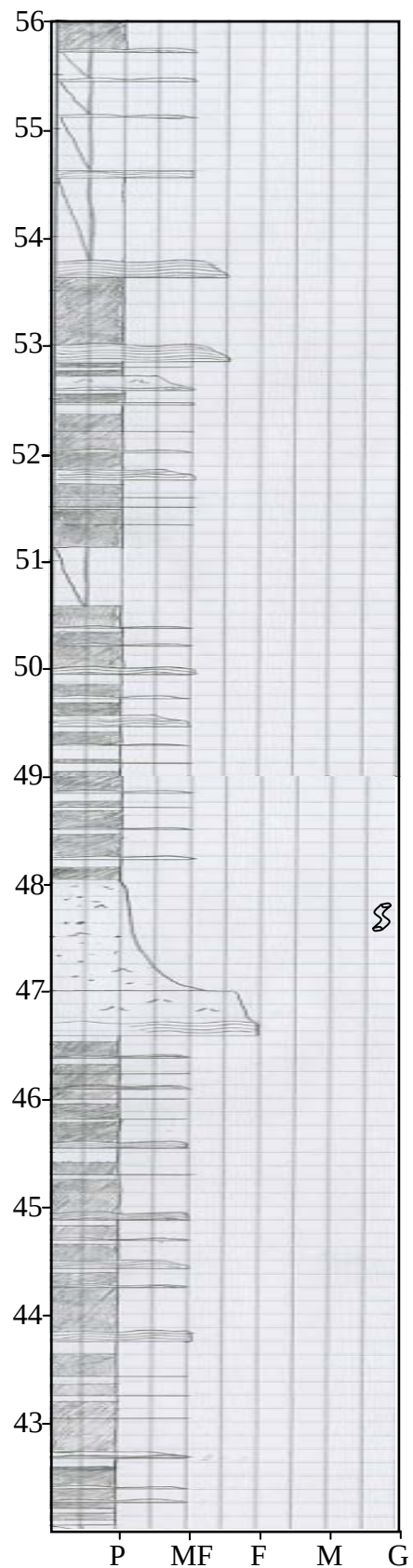
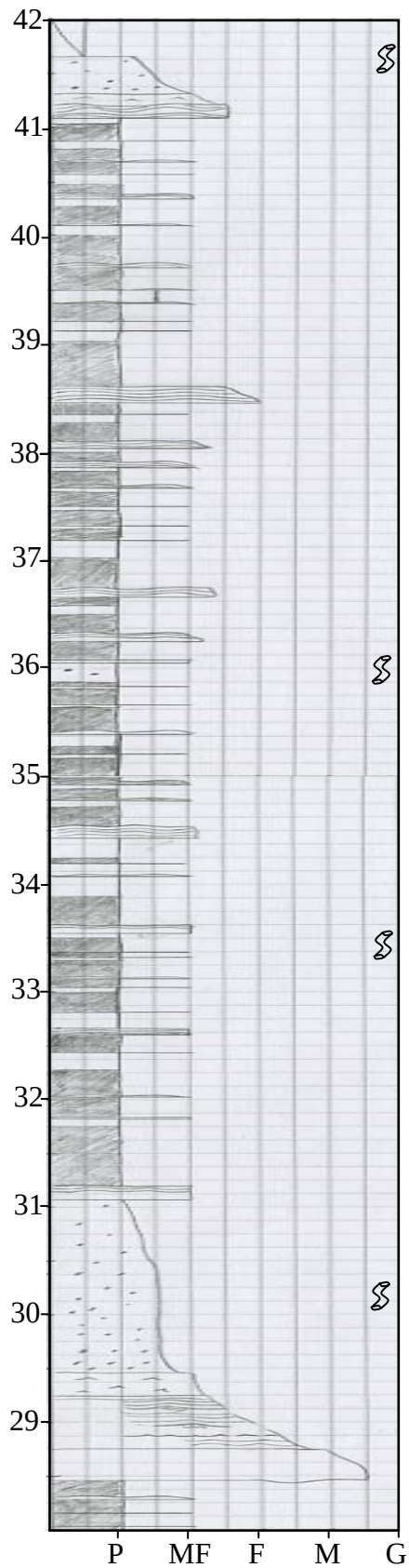


Figura 10- A) Mappa geologica schematica dei Perinei centro-meridionali, Spagna (da Remacha *et al.*, 1988) e B) Mappa di localizzazione delle sezioni stratigrafiche di Ansò ed Aragüés del Puerto (Carta Escursionista de los Pirineos 1: 40.000, Editorial Perineo, S.L.).

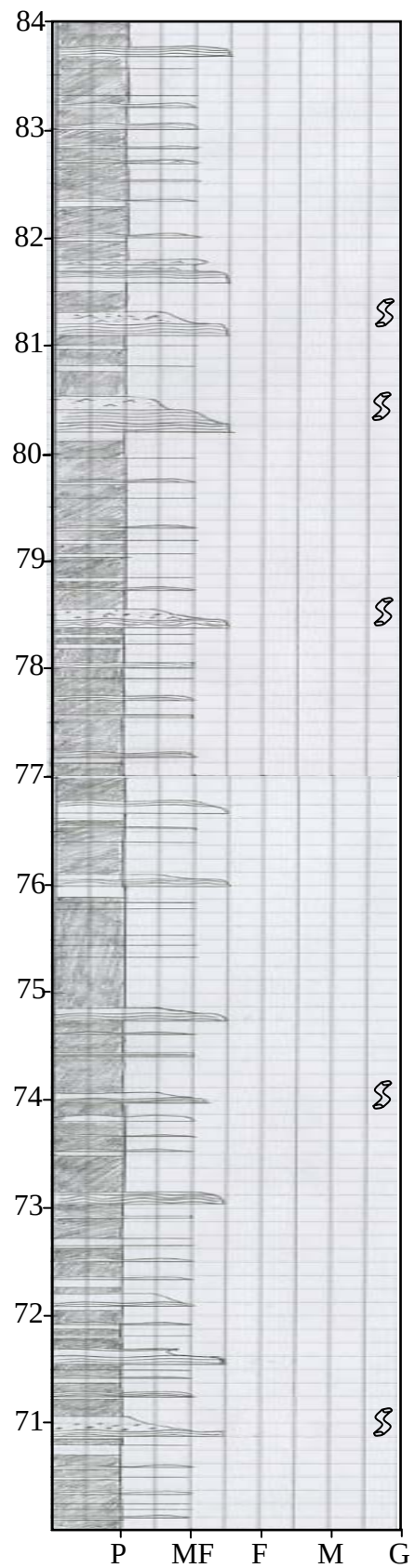
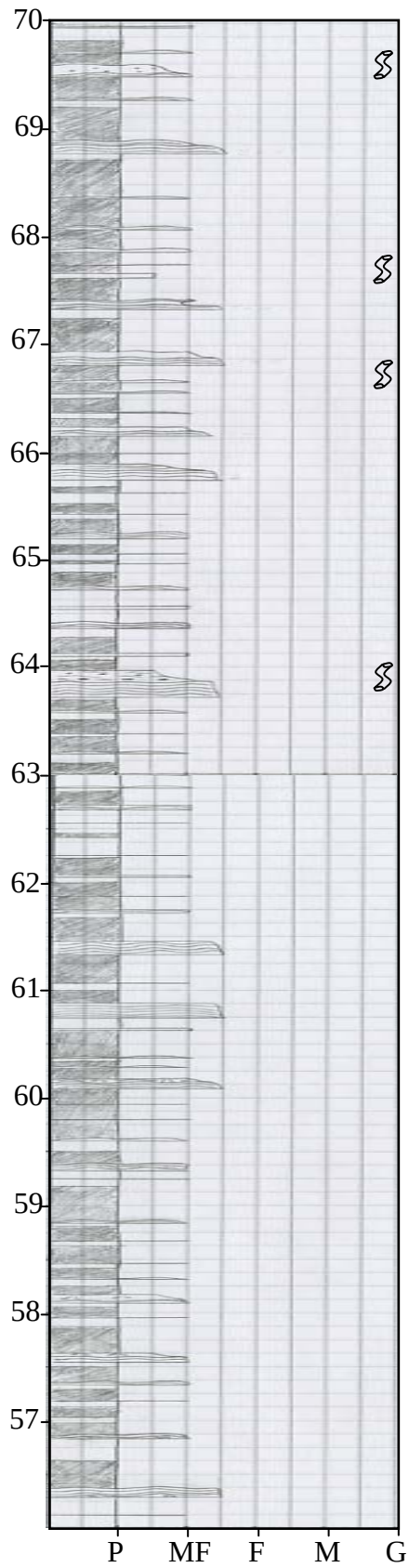
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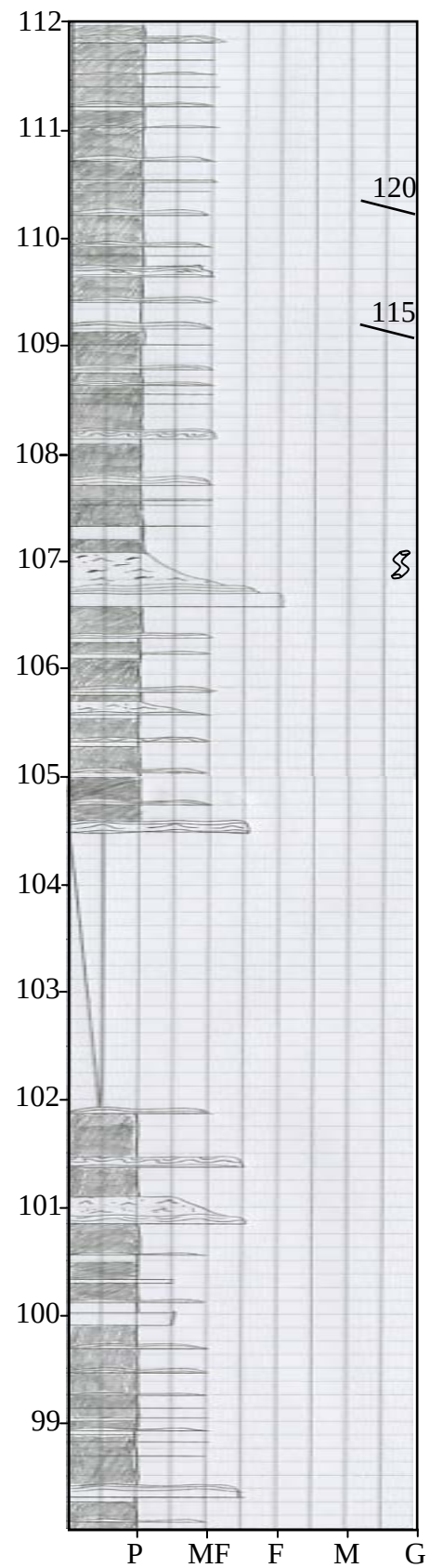
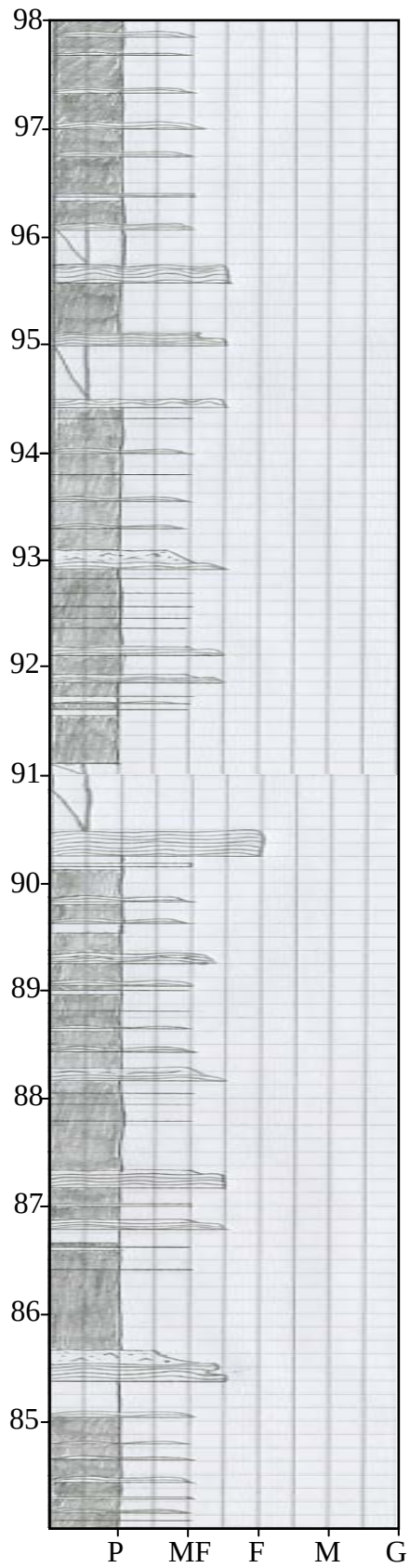
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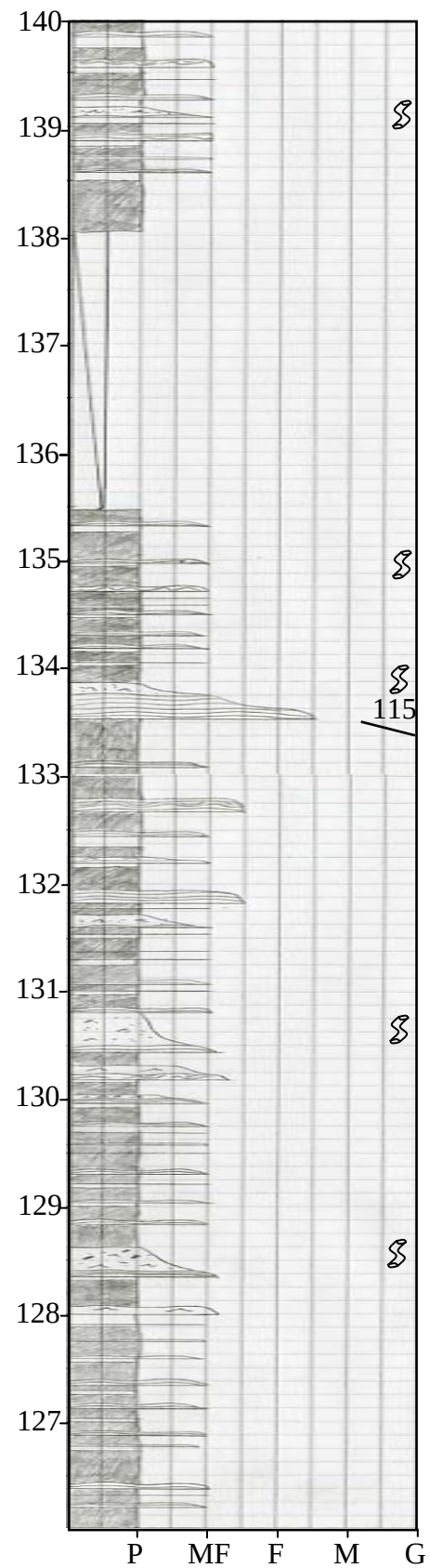
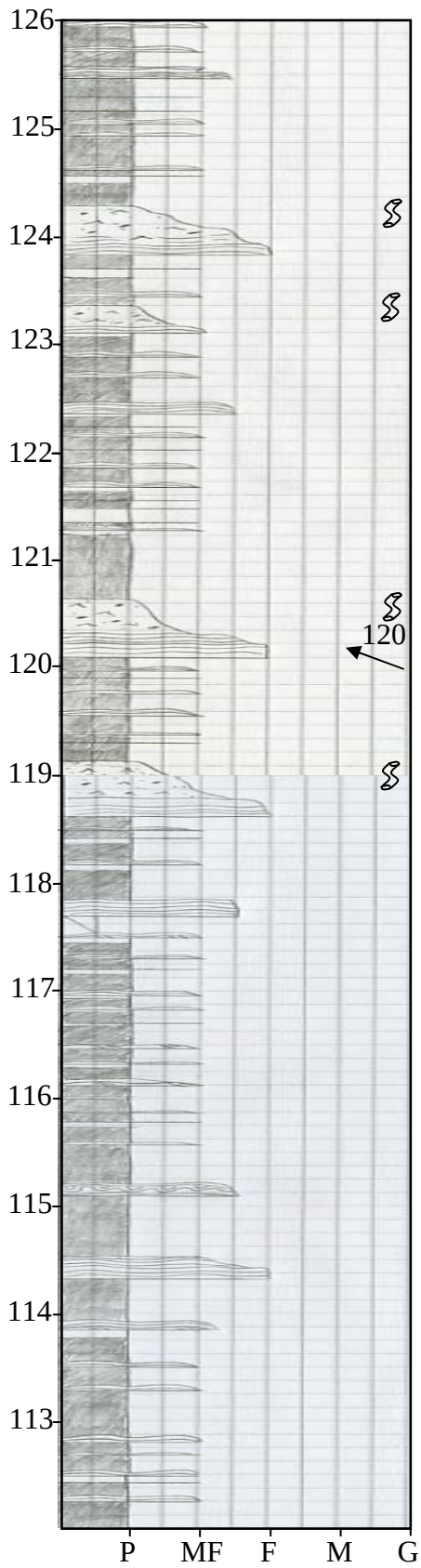
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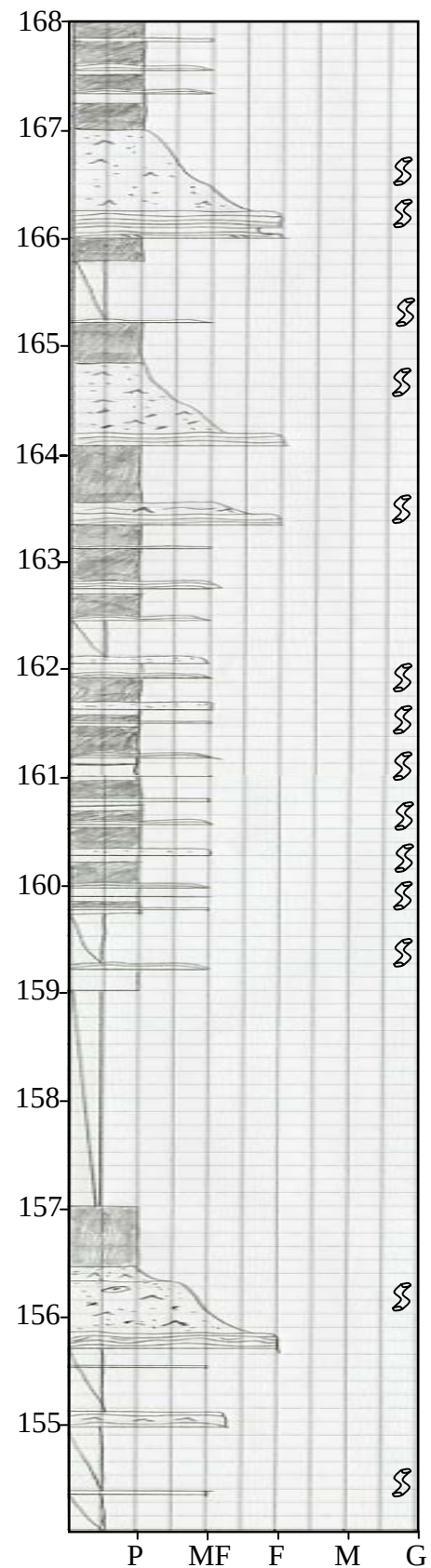
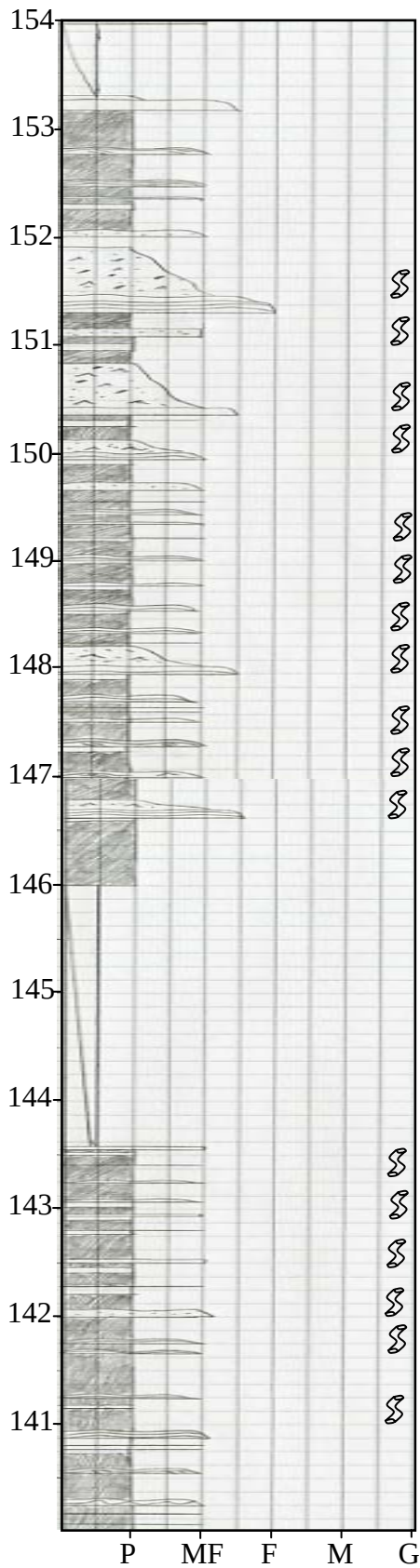
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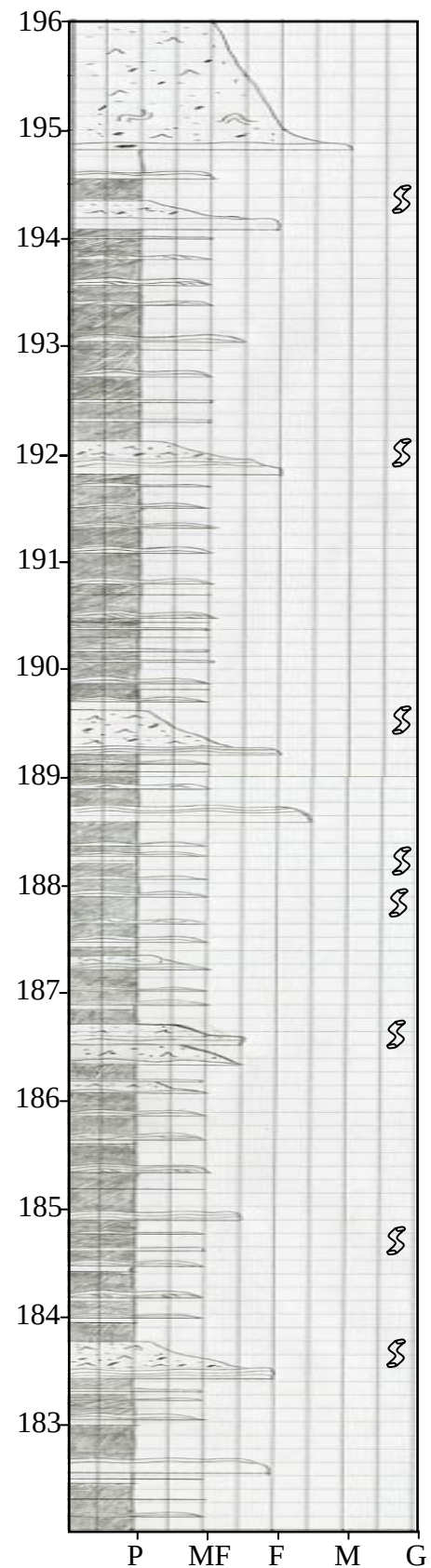
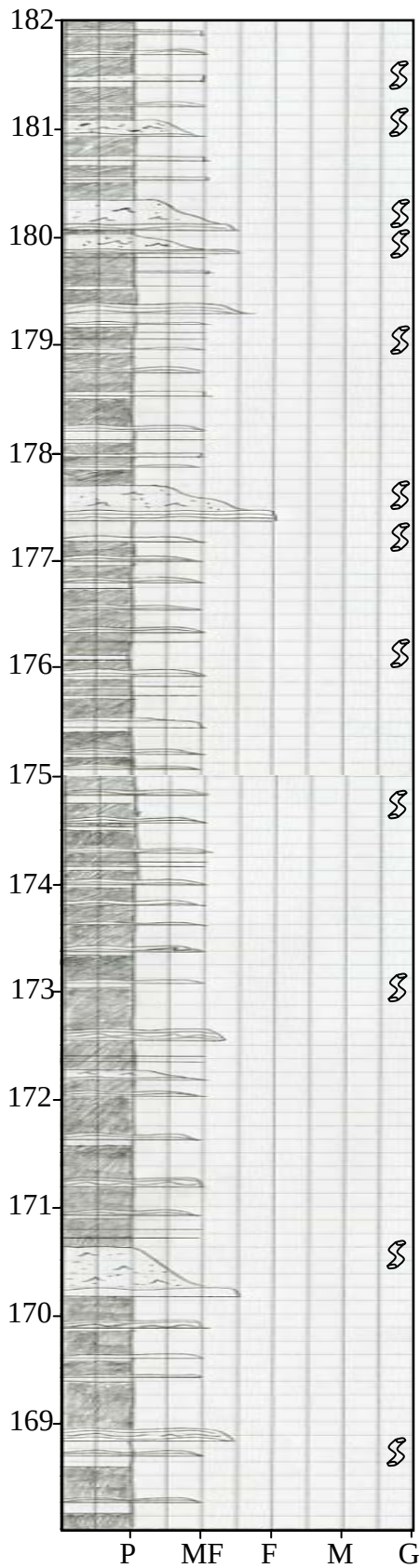
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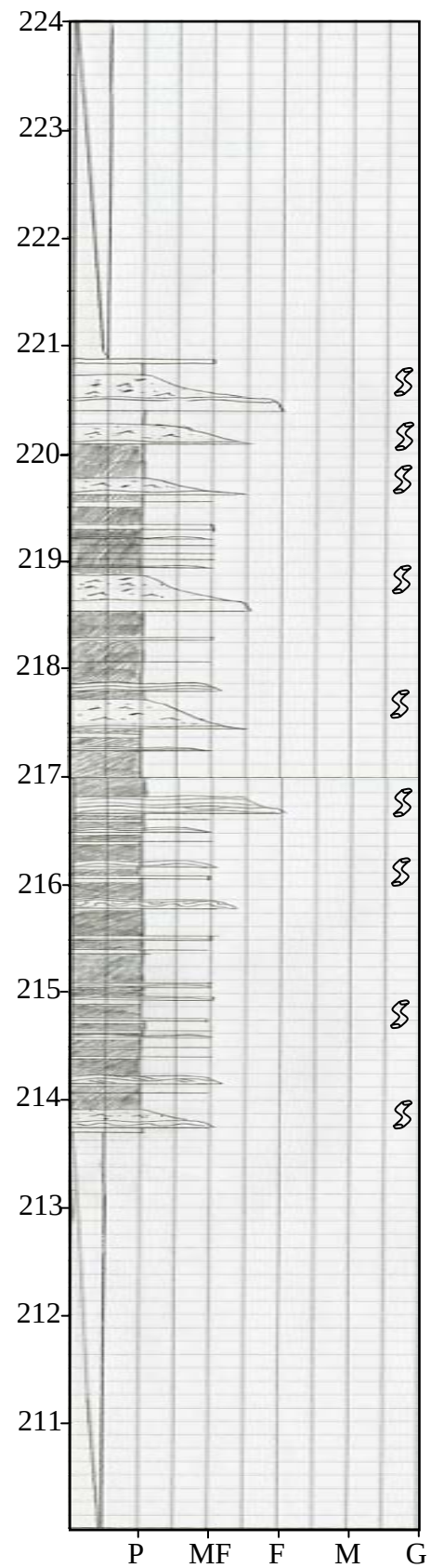
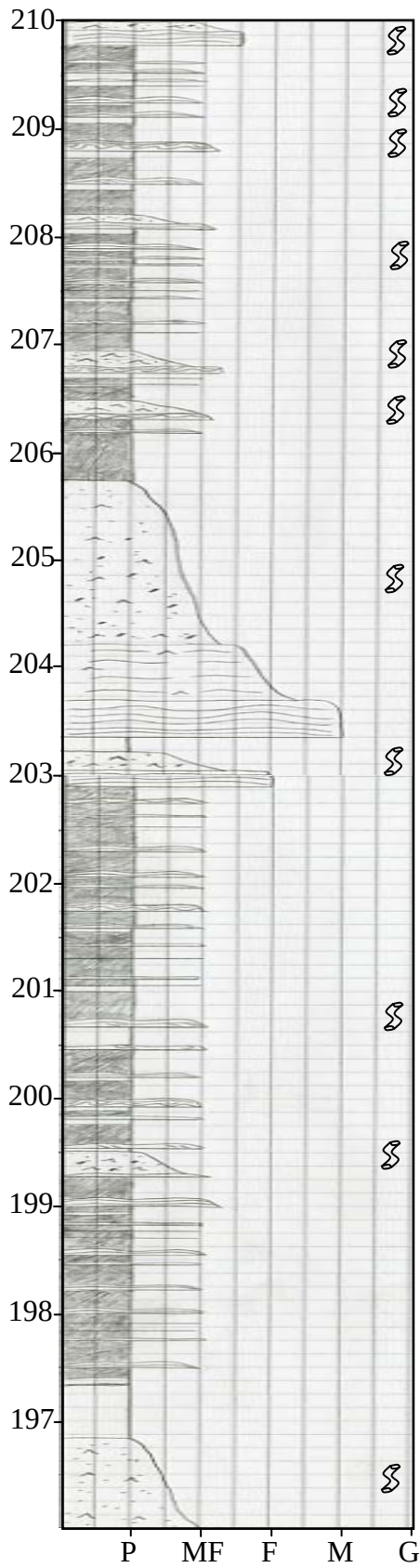
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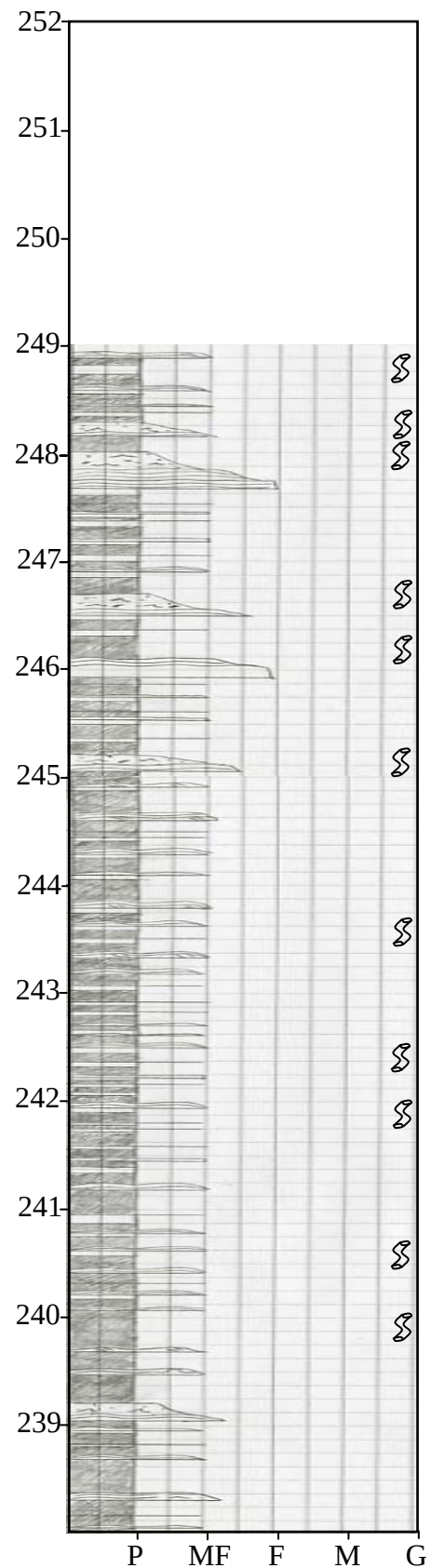
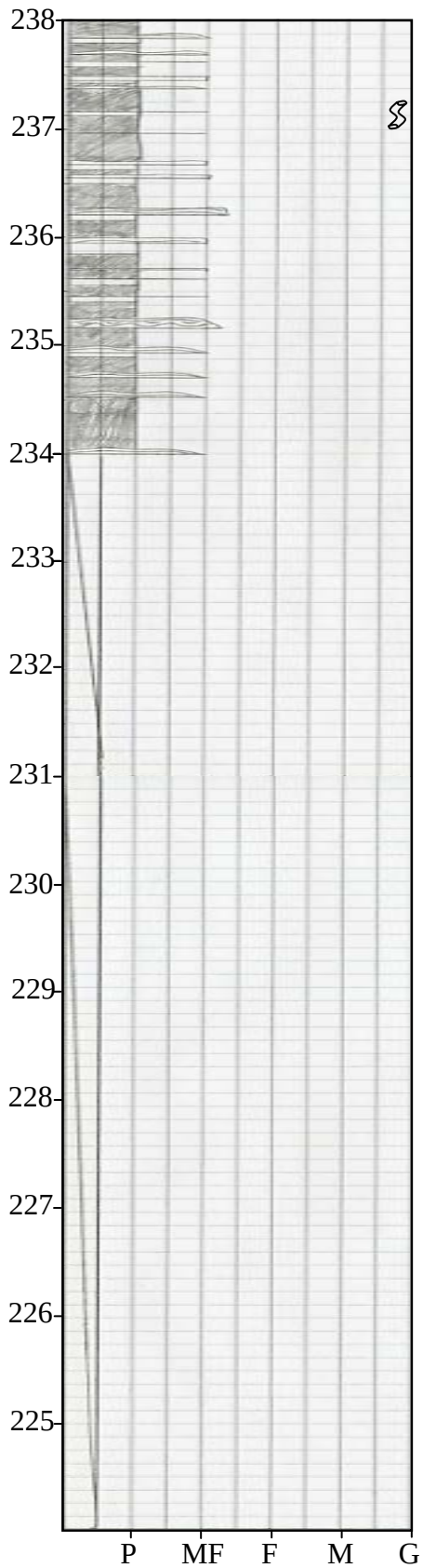
Ansò



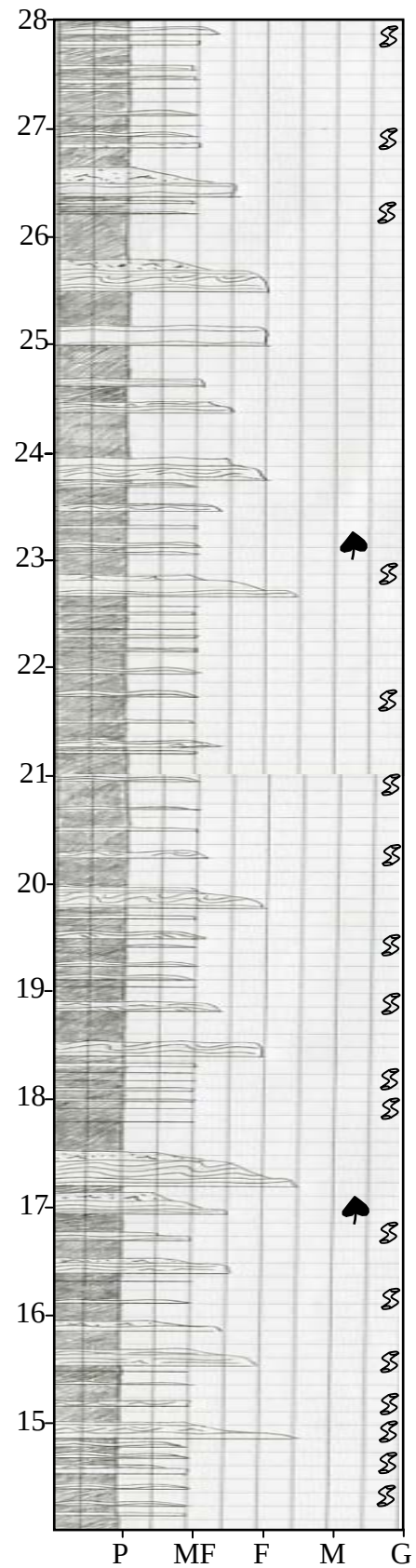
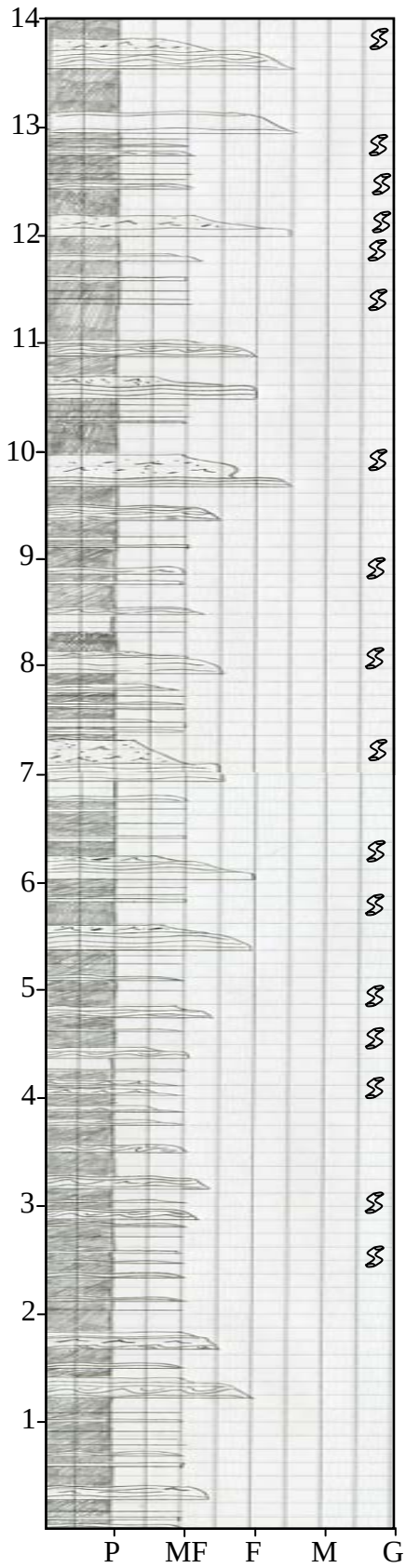
Ansò



Ansò



Aragüés del Puerto



Aragüés del Puerto

